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GENERAL INDEX.

(Illustrated articles are designated by an asterisk * before the page number.)

- Adhesion between two beeches, *91.
 Albinism in *Cirsium lanceolatum*, 11, 55.
 " " *Geranium maculatum*, 36.
 " " *Lonicera oblongifolia*, 36
 " " *Iris versicolor*, 123.
 Alder catkins, note on, 57, 84.
 Algae, New England, notes on, 65, 69.
 " fresh-water, *25.
 Andropogon Jamesii, note on, 52.
 Arceuthobium, new station for, 33.
 Arisaema, multiplication of spadices, 90.
 Arthrocladia villosa, 127.
 Beech, a protection from lightning, 116.
 " adhesion in, *91.
 " heterophyllly in, 144.
 Blackberry, white-fruited, 24.
 Bonpland, origin of the name, 92.
 Botanical Club, Syracuse, 36, 132, 156.
 " Torrey, 12, 24, 60, 96, 119, 144, 155.
 " Literature, 57, 94, 106, 118, 132, 143, 155.
 " Notes, 92, 106, 117, 129, 141, 153.
 Botrychium, abnormal, 23, 100, 116.
 Californian plants, new, 15, 31.
 Caliciopsis, new genus of fungi, *62.
 Camblum-layer, phenomena, *137.
 Carex riparia, new variety of, 151.
 " Dewey, query concerning, 35.
 Carices, errors in descriptions, 82.
 Carrot, proliferation in, 151.
 Chara, development of cortex in, *37.
 Chemung Co., N. Y., notes from, 72.
 Chlorophyll, 141.
 Compositae, new species of, 15, 169.
 Concentric annual growths, 10.
 Coniferae, preservation of specimens, 96.

CONTRIBUTORS:
 Allen, T. F., *37.
 Bailey, L. H., Jr., 24.
 Bailey, W. W., 11, *50, 57, 90, 106, 114, 116, 129, 152.
 Banning, Mary E., 125, 153.
 Beal, W. J., 69.
 Bessey, C. E., 11.
 Britton, N. L., *12, 101, 149.
 Chickering, J. W., Jr., 140.
 Clapp, H. L., 34.
 Cleveland, D., 55.
 Collins, F. S., 69.
 Cope, Mary S., 12.
 Davenport, Geo. E., 20, 68, 71, 99, 108.
 Day, D. F., 127.
 Eaton, D. C., 49, 57.
 Ellis, J. B., 18, 73, 98, 111, 118, 133.
 Engelmann, George, 4, 137.
 Farlow, W. G., 65.
 Gray, Asa, 72, 152.
 Greens, Edw. Lee, 15, 62, 109, 121, 145.
 Haberer, J. V., 33.
 Hervey, A. B., 120, 126.
 Hogg, Thos., 85.
 Hollick, Arthur, 12, *129, 149.
 Howe, E. C., 35, 82, 90.
 Jones, M. E., 5, 31, 91, 92, 116, 124, 128.
 Lockwood, S., 152.
 Lucy, T. F., 72.
 Meehan, Thos., 10, 11, 55, 82, 151.
 Mellichamp, J. H., 115, 138.
 Parry, C. C., *30, 97.
 Peck, Chas. H., *1, *61, *121.
 Prentiss, A. N., 8.
 Rau, E. A., 105.
 Ravenel, H. W., 23, 112, 128, 140.
 Rusby, H. H., 53, 78, 106.
 Rust, Mary O., 6, 17, 37.
 Schrenk, Joseph, *47, *83, 90.
 Scribner, F. L., 32, 34, 52, 56, 74, 86, 103, 134, 145, 153.
 Smith, Chas. E., 82*
 Stone, W. E., 56, 64.
 Tracy, C. T., 84.
 Trelease, Wm., *103.
 Trimble, Wm., 10, 140.
 Tuckerman, Edw., 142.
 Tweedy, Frank, 23.
 Vroom, J., 92.
 Willey, Henry, 6, 33, 57, 152.
 Willis, O. R., 8.
 Wolfe, F., *25.
 Wood, T. F., 115.
 Wright, S. H., 86, 151.
 Corema Conradii, new station for, 83.
 Corona of the Narcissus, 106.
 Crucifer, a new Mexican, 124.
 Cucurbita, the fruits of, *30.
 Dandelion, adventitious leaf on, 11, 129.
 Dicentra Canadensis, tubers of, 90.
 " Cucullaria, rootstock of, *47.
 Dichromena, a new species of, 96.
 Dickie, Dr. G., death of, 120.
 Echinosperrum Greenei, 128.
 Electric phenomena in plants, 142.
 Eleocharis nodulosa, note on, 56.
 Epigaea repens, late flowering, 12.
 Epipactis Helleborine, new station, 127.
 Evolutionist, a forgotten, 93.
 Exogens, growth of, 8.
 Ferns, notes on, 20, 58, 91, 99, *129.
 " of the U. S., new or little-known, 49.
 Flora, Canadian, 140.
 " of Newport, R. I., notes on, 23.
 " " Richmond Co., N. Y., 149.
 " " Utah and Nevada, notes on, 5.
 " " U. S., additions to, 4.
 " " White Mts., notes on, 114.
 " " Wyoming and Colorado, 156.
 Floras, local, 107.
 " " of U. S., lists of, 80.
 Flowers, the colors of, 117.
 " cross-fertilization by insects, 131.
 " of Menyanthes, dimorphous, 92.
 Fruits of Cucurbita, *30.
 Fuchsia, monstrous flowers in, *102.
 Fungi, new North American, 18, *61, 73, 98, 111, 133.
 " in wrong genera, *1.
 " expansive power of, 129.
 " preservative for, 153.
 Grape-vines, large, 11, 23.
 Grass, change of name in, 32.
 Grasses of Arizona and California, 74, 86, 103, 145.
 " North American genera of, 134.
 " of Oregon, note on, 34.

Grasses, note on, 153.
 Gratiola, proliferation in, 139.
 Gymnocladus a fly-poison, 130.
 Helonias bullata, new station for, 101.
 Heterocentron roseum, note on, 11.
 Hieracium aurantiacum, 12.
 Holozonia, new genus, 152.
 " filipes, note on, 145.
 Ilex, a yellow-berried, 152.
 Iris, albiniam in, 128.
 " versicolor, germination of, *83.
 Leaf-forms, design of some, 34.
 Leaves, dimorphic, of aquatic plants, 141.
 Leggett, William Henry, 85.
 Lichens, theory of, 83.
 Lily, an electrified, 153.
 Massachusetts, notes from, 56, 84.
 Mayflower, the name, 92.
 Menyanthes, dimorphic flowers of, 92.
 Migrations of plants, 11.
 Mummy garlands, 142.
 Myco-lichens, 6.
 Narcissus, corona or cup of, 106.
 Nevada, notes on flora of, 5.
 North Carolina, notes from, 115.
 Nutation in Epilobium, 8.
 Oak, hybrid, near Keyport, *13.
 Oaks, hybrid, 55.
 " variability of, 118.
 Onoclea sensibilis, var. obtusilobata, 6.
 Ophioglossum vulgatum, 55.
 " nudicaule, 71.
 Oriole's nest, vegetable fibres in, 57.
 Parmelia furfuracea in embalming, 152.
 Phaeoaction, new genus of algae, 56.
 Phalloid, an imperfectly described, *123.
 Physalacria, new genus of fungi, *2.
 Physarella, new genus of fungi, *61.
 Plants, aquatic, dimorphic leaves, 141.
 " Californian, new, 31.
 " drying of fleshy, 92.
 " electric phenomena in, 142.
 " exchanges, 84.
 " migrations of, 11.
 " Western, new, 62, 121.
 Psilotum triquetrum, new station, 128.

PUBLICATIONS NOTICED:
 Annual Report Amer. Mus. Nat. Hist., 95.
 British Fresh-water Algae, by M. U. Cooke, 94.
 Bulletin Buffalo Soc. Nat. Science, 132.
 Catalogue of Hanover (N. H.) Plants, by H. G. Jesup, 95.
 Contributions to Flora of Iowa, by J. C. Arthur, 118.
 Contributions to American Botany, by S. Watson, 132.
 Darwin, par A. De Candolle, 119.
 Darwin, Charles R., by J. F. James, 119.
 Dictionary of Popular Names of Plants, by John Smith, 155.
 Flora of Westchester Co. (N. Y.), by O. R. Willis, 94.
 Grevillea, 144.
 Index to the genus Carex, by J. F. James, 118.
 Manual for the Preservation of Fungi, by J. L. English, 59.
 Names of Herbes, by Wm. Turner, 53.
 Notes on the Trees of the Lower Wabash, etc., Valleys, by R. Ridgway, 119.
 Our Native Ferns, by L. M. Underwood, 109, 119.

Proceedings of Boston Soc. Nat. Hist., 119.
 " Davenport Acad. Sci., 143.
 " Philadelphia Acad. Nat. Sci., 119.
 Report U. S. Commission of Fisheries, 132.
 Sur un Caractère de la Batate, par A. De Candolle, 119, 130.
 Sylloge Fungorum, by P. A. Saccardo, 118.
 Symbolae Licheno-Mycologicae, by Dr. A. Minks, 143.
 Synopsis of N. Amer. Lichens, by E. Tuckerman, 57.
 The New Botany, by W. J. Beal, 119.
 Transactions of Mass. Hort. Soc., 119.
 Woody Plants of Ohio, by Jno. A. Warder, 155.
 Purslane, night-closing of leaves, 153.
 Quercus palustris, striped acorns, 57.
 Rhus cotinoides, rediscovery of, 153.
 Rosa minutifolia, fruit of, 127.
 Rose, new North American, 97.
 Salix, brittle branches of, 82, 89, 90.
 Seeds, latent vitality of, 131.
 Snake, lignified, *137, 152.
 Sphagnum, notes on the genus, 105.
 Staphylea, late flowering of, 144.
 Suggestion, a, 82.
 Sweet potato, a character of the, 130.
 Teratological notes, 10, *102, 140.

TERATOLOGY:

Adhesion in Fagus, *91.
 " " Abies, 155.
 " " Acer, 155.
 " of syncarps in Rubus, 130.
 Adventive leaf in Taraxacum, 11, 129.
 Fasciation in Ranunculus, 10.
 " Taraxacum, 10.
 " Linaria, 141.
 Fission of pedicels in Convallaria, 120.
 Heterophylly in Fagus, 141.
 Metophylly in Fuchsia, *102.
 " Urginea, 103.
 Multiplication of spathes in Symplocarpus, 10, 84.
 Multiplication of spadices in Arisaema, 90.
 Phyllody of bracts in Alnus, 120.
 Polyphylly of corolla in Houstonia, 10.
 " " in Claytonia, 140.
 " " gynoeceum in Fraxinus, 11.
 " bracts in Hepatica, 10.
 Proliferation in Daucus, 151.
 " " Erigeron, 141.
 " " Gratiola, 139.
 " " Plantago, 10.
 " " Ranunculus, 141.
 " " Symplocarpus, 10.
 " " Verbena, 141.
 Suppression of involucre in Anemone, 120.
 Synanthly in Fuchsia, *102.
 Syncarpy in Erumus, 120.
 Virescence in Rosa, 155.
 Torenia Asiatica, fertilization of, *51.
 Trees of the South-west, 53, 78, 106.
 Tricardia Watsoni, 52, 116.
 Tuckahoe, etymology of, 115.
 notes on, 125, 140, 152.
 Verbascum, a hybrid, 10, 151.
 Vincetoxicum nigrum, 106, 130.
 " Scoparium, 115.
 Weeds, the migration of, 112.
 Westchester Co., N. Y., gleanings in, 85.

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[No. 1.]

ind Fungi in Wrong Genera.
By CHAS. H. PECK.

More than fifty years ago L. de Schweinitz sent specimens of a small American fungus to Prof. Elias Fries. He gave it, in his letter, the manuscript name, *Leotia inflata*; but Fries, taking it to be a species of *Mitrula*, published a description of it in *Elenchus Fungorum*, Vol. i. pp. 234 and 235, giving it the name *Mitrula inflata*, with a reference to the manuscript name of Schweinitz. In *Epicrisis*, p. 584, he repeats his diagnosis of the species thus: "*M. inflata albida*, capitulo subgloboso, inflato, stipite filiformi elongato."

In 1878, M. C. Cooke republished this diagnosis in *Mycographia*, p. 204, under the name *Spathularia inflata*, though it is not clear why the species was referred to *Spathularia*, for the plant has not a laterally-decurrent club, an essential character of that genus. He also published a figure of the plant, with the remark, "sporidiis ignotis." Inasmuch as this figure gives no representation of the fruit, it has seemed best to give a new one, representing the fungus more in detail. The reference in *Micographia*, l. c., "*Leotia inflata*, Schw., Syn. Car. 1120," is erroneous, for this number belongs to "*L. circinalis*," which was evidently intended for *L. circinans*, as is shown by 738 Syn. N. A. Fungi. It does not appear that Schweinitz ever published a description of this fungus, and in the work last mentioned, at number 1068, he adopts the name *Mitrula inflata*, with a reference to the description in *Elenchus Fungorum*.

Having recently found and examined fertile specimens of this fungus, I have been forced to the conclusion that it belongs neither to the genus *Leotia* nor to *Mitrula*, nor yet to *Spathularia*, but to an undescribed genus of Hymenomycetes, belonging to the order Clavariei and related to the genus *Pistillaria*.

The plants usually grow in tufts of few or many individuals. Sometimes the heads are so closely crowded that they grow together, and frequently the stems are united at the base. Luxuriant specimens are about an inch high, but ordinarily they are one-half to three-fourths of an inch high. At first they are pure white, but with age the heads or clubs acquire a yellowish tint and then soon decay. The stems often remain firm and upright after the heads have decayed. The walls of the hollow club are very thin but rather tough, and when moist they will stretch considerably before the tissue will separate. Oblong, club-shaped bodies are scattered here and there in the hymenium which covers the head or club. These bear a strong resemblance to asci, and they may possibly have been thought to be such by those authors who first referred the fungus to Ascomycetous genera; but I am confident that they are not asci. I have not been able to detect spores in them, even in specimens which produced spores in abundance. They are usually a little narrowed or even contracted just below the

apex, and probably correspond to the cystidia of Agarici. The basidia or sporophores are much smaller and more numerous. They form a thin stratum over the surface of the globose head. I have not clearly seen them with more than two spicules each. The genus and species may be described as follows :

PHYSALACRIA, *Gen. nov.*

(From *φυσάλις*, a bladder, and *ἄκρᾱ*, the top.)

Club subglobose, inflated, thin, somewhat tenacious, everywhere covered by the hymenium, supported on a distinct slender stem.

Distinguished from *Pistillaria* by the thin, inflated, bladder-like club and the distinct slender stem. The following is at present the only species known :

PHYSALACRIA INFLATA.—White, becoming tinged with yellow ; club subglobose, submembranaceous, glabrous, flaccid, more or less uneven with irregular depressions or wrinkles, two to four lines broad ; stem slender, equal, firm, straight, solid, four to nine lines high, minutely hairy or subfurfuraceous, mostly caespitose ; spores minute, narrowly elliptical, colorless, .00016–.0002 of an inch long, and about half as broad.

Decaying wood and bark in woods and shaded places. It occurs especially in mountainous or hilly districts in summer.

The fungus described in the BULLETIN, Vol. vi, p. 77, under the name *Lycoperdon Warnei*, was referred to the genus *Lycoperdon* with some misgivings, because the spores and capillitium presented characters not quite in harmony with the characters of that genus. Afterwards, specimens of the same fungus were sent me from Wisconsin by Mr. Bundy, but some of them showed a distinct stem. This indicated that the species might belong to the genus *Podaxon*, to which, in a remark in a paper on United States species of *Lycoperdon*, it was erroneously referred. Since that time, other specimens have been received from various sources, and a careful examination of them makes it necessary to refer the species to the genus *Secotium*. Besides, the plant is so very variable that a more comprehensive description is desirable.

SECOTIUM WARNEI.—Peridium subglobose ovate or oblong, one to four inches high, one to three inches broad, squamose, white, gray or brownish, sessile or with a short stem, when mature rupturing longitudinally at the base into four to six lobes or laciniae ; internal mass at first whitish, then dingy-yellow, finally olivaceous-brown or snuff-brown ; spores subglobose or broadly ovate-elliptical, colored, .00025–.0003 of an inch long,

Fields, pastures and waste places. Illinois ; H. A. Warne. Wisconsin ; W. F. Bundy. Iowa ; C. E. Bessey. Nova Scotia ; A. H. McKay. Pennsylvania ; Lizzie G. Barnett.

This fungus occurs especially in wet weather in summer and autumn*. The species is related to *S. Szabolcsiense*, Hazl., which is described as having the internal mass (when mature) chestnut-colored and the peridium glabrous and splitting into ten to twelve

*Miss Barnett writes that she has also found it in May.

lobes at the base, characters not shown by our plant. The scales in our plant are thin, whitish or brownish and generally appressed and spot-like. Sometimes they are evanescent in the dried specimen, but generally they are distinct. The internal mass or hymenium is at first white and seems to vary somewhat in its appearance. Miss Barnett says concerning these fungi, that, when cut, the inside resembles white crape all crumpled up, but after exposure this becomes brown and then dusty like ordinary Lycoperdons. Prof. Bessey writes that, upon cutting open one or two of these fungi, he observed a most remarkable regularity in the spore-bearing surfaces, and that they bore a resemblance to the gills of unexpanded Agaricini. The arrangement of the variously folded and united hymenial plates and their intercellular spaces is clearly not uniform, but I doubt if any characters for specific distinction can be drawn therefrom. I certainly find no satisfactory characters for distinguishing the Pennsylvania from the Iowa specimens. This species (and indeed the whole genus) is very interesting, affording as it does a beautiful connecting link between the Hymenomycetous Agaricini and the Gasteromycetous Trichogasters. The distinct stem shown by some of the Wisconsin specimens adds another feature of resemblance between the two groups, for it would be difficult without a close examination to say that one of these stipitate specimens was not an unexpanded Agaric. When mature, the spores may, by sudden pressure, be expelled through the chinks of the peridium in little smoke-like puffs, in the same manner as the spores of puff-balls.

One other species of *Secotium* has occurred in this country, viz., *Secotium Texense*, B. & C., which, according to the description, has the hymenium black, the spores but .0002 of an inch in diameter and the stem ventricose and three inches high.

NOTE.—I have just received specimens of *Secotium Warnii*, with notes thereon, from Miss E. Butler of Minnesota. These indicate a still greater variation in the specific characters than that provided for in the description already given. First; the scales of the peridium are sometimes quite thick and broad, and are somewhat reflexed so that they give to the plant a rough or even a shaggy appearance. Second; the size is sometimes greater than the dimensions given in the description. One specimen before me measures five inches in length and the same in breadth in the widest part, and that too in the dried state. In the fresh condition it would be likely to be still larger. Third; the plants sometimes grow in tufts or compact clusters. The large specimen already mentioned is irregular in shape, the irregularity having been produced by the crowded mode of growth and the mutual pressure of contiguous individuals. The smallest specimen of the group from which the large one was taken is only three-fourths of an inch high and broad in the dried state. Miss Butler mentions two clusters or colonies, one composed of ten, the other of thirteen individuals. She says of the specimens, "they grew among rank weeds on waste land where garbage had been thrown." It is possible that in such situations they grow more luxuriantly than in open fields. Most of the Minnesota specimens

sent me, as well as those from Pennsylvania, are subglobose, from which I infer that in these localities this is the prevailing form.

EXPLANATION OF THE PLATE.—*Physalacria inflata*.—Fig. 1, a cluster of plants. Fig. 2, a single plant enlarged. Fig. 3, three cystidia x 400. Fig. 4, five basidia, one of them bearing two spores x 400. Fig. 5, six spores x 400.

Secotium Warnei.—Fig. 6, an obovate plant. Fig. 7, a small ovate plant with a distinct stem. Fig. 8, a small subglobose umbonate plant. Fig. 9, vertical section of an oblong plant, showing the hymenial plates and percurrent stem. Fig. 10, a basidium bearing four spores x 400. Fig. 11, seven spores x 400.

Additions to the Flora of the United States.—*Crataegus arborescens*, Ell., is not uncommon in the rich alluvions of the Mississippi River, near St. Louis, and probably inhabits the banks of this river and its lower tributaries down to its mouth. It has not been recognized of late and seems to be quite rare in herbaria, and is probably not in cultivation. I have not much to add to Elliott's, Torrey and Gray's and Chapman's descriptions, but may say that in this neighborhood it is the largest species of the genus, making trunks from 8-12 and, as Mr. Eggert informs me, even 18 inches in diameter, 5-7 feet high, fluted or grooved, and with a broad top, rarely bearing any thorns. The leaves, cuneiform at base, undivided or, at the end of shoots, 3-lobed, resemble in form those of *C. tomentosa*, but are smaller, much thinner and smoother, even when young, often with soft down, in the axils of veins underneath; flowers in loose corymbs, only 7 or 8 lines wide; calyx smooth, neither pubescent nor glandular, with triangular acute lobes; styles 5; drupes depressed-globular, 4-5 lines thick with 5 (or rarely more) stones grooved on the back, bright red or rarely orange-colored, persisting through winter, when those of our other species, *C. coccinea*, *Crus-galli*, *subvillosa* and *tomentosa* drop off.

Sagittaria natans, Michx., has been noticed by Mr. C. E. Faxon, since a number of years in Charles River, Mass., "at the depth of 2 to 4 feet, and entirely above the influence of tide-water," and also, as he informs me, in Neponset and in Ipswich Rivers, where Mr. J. Robinson found it. It flowers there from the middle of June to the end of July, but never perfects fruit, and thus is evidently not at home in those northern waters, where it has a precarious existence by stolons; these can only winter where deep water protects them from frost. The seed was probably first brought there from the South, by water-fowl who disseminate so many water-plants. Scape and phyllodia 2-4 feet long, barely reaching the surface of the water, leaf-blades rarely developed, and then linear-lanceolate; raceme as well as pedicels often elongated in order to reach air and light; flowers 6-7 lines wide, opening in forenoon, submerged again toward evening, only one or two of the lowest whorl fertile, the others all male; male flowers with 6 exterior and 1 or 2 central stamens; filaments about as long as the nearly orbicular anthers, bulbous at base and smooth; pistils of the female flowers numerous, minute, erect, style as long as the ovary; fruit (never matured in the North) in southern specimens marked by several (5 or 7) denticulate crests on back and sides. *Sagittaria pusilla*, Pursh., must be considered as a subterrestrial form of this species, distinguished only by its size and by a 3-crested achen. *S. graminea*, with which I had confounded the northern

form, is distinguished by the great number of stamens and the papillose filaments, even where the fruit can not be compared.

G. ENGELMANN.

Notes from Utah and Nevada.—It was my good fortune on returning from California to spend a day or two in the East Humboldt Mountains, Nevada, where Mr. Watson botanized years ago. Some very interesting plants were found; among them, *Aspidium aculeatum*, var. *scopulinum*. This grew in the crevices of rocks at 9000 feet altitude. On reaching Salt Lake City, I had occasion to botanize at Wasatch, 20 miles southeast, at the mouth of Little Cottonwood Canyon, (altitude about 5000 feet); there I found the same fern growing in the crevices of wet rocks. It has the habit of *Aspidium Lonchitis*, and closely resembles it. I see no resemblance to *A. aculeatum* and cannot see how it came to be referred to that species. I understand that Prof. Eaton contemplates transferring it to *A. mohrioides*. I was able to secure quite a number of fronds and two living plants, by which it will be possible to study it still more closely. I am indebted to Mr. Davenport for the determination.

Prof. Eaton, in Bot. Wheeler's Rep., says that the sterile fronds of *Pellaea densa* are rare. This is not the case in Utah. They are on almost every root of plants that grow at high altitudes.

The spore-cases of *Notholaena dealbata* are quite interesting. They are oval, light chocolate-brown, splitting entirely in two, one half remaining behind like the lower half of the pod of *Portulaca*, making the frond appear as if covered with minute shells.

In my specimens of *Sidalcea malvaeflora* the pods are reticulated, not smooth as stated in Botany of California.

Dalea polyadenia is thorny and makes unpleasant swellings, when the thorns pierce the flesh, as though it were poisonous.

Astragalus multiflorus dries black, and is almost the only species that I know which does dry thus.

The appressed hairs of *Townsendia scapigera* are almost always two-jointed and bent at the joints and so appressed.

I have specimens of *Chaenactis Douglasii* from Nevada, with the five outer pappus-scales black at base and almost-as long as the akene, the five inner scales narrow, half as long; akene hirsute.

In *Chaenactis carphoclinia* the chaff subtends only one or two rows of outer akenes in my specimens.

Allium validum has a narrowly-winged stem, and bulb-coat reticulated, much like *A. anceps*; the style is not always "longer than the stamens." In other respects my specimens agree with Watson's, which were gathered in the same mountains.

I have *Carex luzulaefolia* from the East Humboldt Mountains, Nevada, as well as from the Wasatch.

I mentioned in a former article that the shape of the sterile filament is now given up as a test in *Scrophularia Californica*. The Utah plants which I have seen have the leaves of *nodosa* and the inflorescence of *Californica*, which adds another to the strong points against the specific value of *S. Californica*. I found a number of plants this season which were devoid of any vestige of a sterile filament.

The flowers of *Phlox canescens* are very often pink or purple, as well as "white."

The seeds of *Erythraea Douglasii* are not "globular" in a great many plants. They also vary in size.

Salt Lake City, Utah.

MARCUS E. JONES.

***Onoclea sensibilis*, var. *obtusilobata*.**—Seeing the notes in the September and October BULLETINS on that form of *Onoclea sensibilis* usually called variety *obtusilobata*, I thought it might be of interest to state in what localities we have found it, and something of my experience in trying to cultivate it in my garden.

I first found, growing in profusion, in a low marshy meadow, some of the finest fertile *obtusilobata* forms, from the same rootstocks on which were the ordinary sterile fronds. Growing side by side in this meadow were all the forms mentioned by Mr. Underwood, as well as some with acute segments open in fructification. When I first visited this spot and found the finest specimens, it had not been mown over; but since that it has been mown every year, and the specimens are not so fine *obtusilobata*. I have also found it growing by roadsides at Pompey Hill, in dry localities, regularly mown. There, most of the fronds more nearly approached the normal sterile form, some having one-half entirely sterile and not at all contracted.

Last year, on our first visit to Cicero Swamp, Mrs. Myers found a great abundance of *obtusilobata* in a portion of the swamp which had been cleared of trees, but not burnt over nor at all cultivated. In the sphagnum, near by, we found *Chiogenes hispidula* and *Gaultheria procumbens*.

In a swampy woods, near Centerville, we have found, several years in succession, fine specimens of *obtusilobata*, while on the Jamesville Road, a few years ago, there used to be a long stretch of the beautiful *Onoclea sensibilis* (never any of the variety) skirting a rich low wood; but the hand of the spoiler felled the woods, and since that time it has all died out without ever showing any *obtusilobata* forms.

Often, when I have found what seemed to me the most perfect *obtusilobata*, I have brought it home and planted it in my fern-bed in the garden only to have it show fine normal sterile fronds (no fertile ones whatever) while by its side *Struthiopteris Germanica*, collected from similar localities, would send up year after year good healthy fertile fronds.

Whether all of this will aid much in proving that *obtusilobata* is no variety and that it is an effort of the species to form a variety, or whether a reversion, I greatly doubt.

Syracuse, N. Y.

MARY OLIVIA RUST.

Mycro-Lichens.—In the recent work by Dr. A. Minks, entitled *Symbolae Licheno-Mycologicae*, devoted to maintaining that a large number of Fungi, amounting to several thousands, are properly to be regarded as Lichens, a list of a considerable number of these Fungi, or Myco-Lichens is given. As several of these occur in this country, a list of them may be of interest to American fungologists,

and is given below. The plants considered, are arranged in series, probably to indicate their affinities, though it is not so stated. In the following list, the series are separated by a dash, and the page on which they are mentioned is given.

Dr. Minks is the most vigorous opponent of the Schwendener theory, that so-called lichens are only fungi parasitically associated with algae, who has yet appeared. His studies have been extensive and exhaustive. Unfortunately, the style in which his views are expressed is so difficult as to be anything but attractive; and few in this country, probably, will have the patience to read his work, *Das Microgonidium*, in which his doctrines are conveyed. He has many original opinions, some of which have not been verified by other observers; but several have seen the *microgonidium*, the organ which, according to Minks, is the fundamental one of lichen structure, and which distinguishes it absolutely from all fungus structure. The microgonidium is an extremely small, simple cell, which, under proper treatment, can be seen in all parts of lichens—in the hyphae, the paraphyses, the spermatia; and the spores, and its history and development are very fully treated in the work above-mentioned.

A few words will elucidate Dr. Minks's mode of treatment. A thin section of the thallus or apothecium of a lichen is to be soaked for a short time (from five to ten minutes), in *liquor potassae*. It is then to be washed and placed in dilute sulphuric acid for about three-quarters of an hour, or until it becomes of the consistence of soft putty. It is then to be placed on a slide, in water, and a small portion of solution of iodine added. With a suitable light, and sufficient magnifying power, the microgonidia are then visible, as minute cells of a bluish-green color. Dr. Minks recommends the use of an immersion lens, and a magnifying power of 1000, with the light reflected from a cloud. It is the detection of microgonidia in the tissues of the fungi enumerated, which leads Dr. Minks to include them among lichens; and a wide field is here opened for those who use the microscope.

1. *Tympanis picastra*, Berk & Curt. *Ala.*, p. 11.
 2. *T. Ravenelii*, B. & C. *S. Car.*, p. 12.
 3. *Phacidium elegans*, B. & C. *N. Car.*, p. 12.
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4. *Tympanis viticola*, (Schwein) Fr. *N. J.*, p. 36.
 5. *T. conspersa*, Fr. *N. J.*, p. 48.
 6. *T. fasciculata*, Schwein. *N. J.*, p. 48.
 7. *Cenangium Cerasi*, (Pers.) *Mass.*, p. 52.
 8. *C. Magnoliae*, B. & C. *Fla.*, p. 54.
 9. *Nodularia acericola*, Peck *N. Y.*, p. 55.
 10. *Dermatea carnea*, Cooke & Ellis. *N. J.*, p. 56.
 11. *D. carpineae*, (Pers). *Mass.*, *N. Y.*, p. 59.
 12. *Patellaria Rubi*, Lib. *N. J.*, p. 63.
 13. *Dermatea tabacina*, Cooke. *N. J.*, p. 69.
 14. *Cenangium turgidum*, Fr. *N. J.*, p. 71.
 15. *Lecidea resiniae*, Fr. *N. E.*, p. 73.
 16. *Lecanidion fusco-atrum*, Rehm. *N. J.*, p. 81.
 17. *Patellaria atrata*, (Hedw.) *N. Y.*, p. 82.

18. *P. indigotica*, Cooke & Peck. *N. Y.*, p. 83.
 19. *P. cucurbitaria*, Cooke. *N. J.*, p. 84.
 20. *P. dispersa*, Gerard. *N. Y.*, p. 84.
 21. *Cenangium triangulare*, (Schw.). *N. J., Mass.*, p. 114.
 22. *Phacidium crustaceum*, B. & C. *Mass.*, p. 115.
 23. *Phacidium autumnale*, Fckl. *Iowa*, p. 131.
 24. *Patellaria ferruginea*, C. & E. *N. J.*, p. 150.
 25. *Phacidium dentatum*, Schmidt. *N. Y.*, p. 155.
 26. *Discella discoidea*, C. & P. *N. Y.*, p. 170.
 27. *Phacidium carbonaceum*, Fr. *N. Y.*, p. 172.
 28. *Discella leguminum*, Cooke. *Texas*, p. 174.
 29. *D. macrosperma*, Peck. *N. Y.*, p. 174.
 30. *Eustegia, Magnoliae*, Peck. *S. Car.* p. 175.
 31. *Patellaria, lignyota*, Fr. *N. J.*, p. 175.
- H. W.
- New Bedford, Mass.

Nutation in *Epilobium angustifolium*, L.—This plant, which is put down in the botanies as willow-herb, but is more frequently called fire-weed, exhibits the phenomenon of nutation in a very marked and interesting manner. The young flowers-buds at the tip of the raceme are erect. A little later, as the stem (axis of inflorescence) elongates, they point downwards and are closely pressed against the stem. Still later, the peduncles of the half-grown flower-buds begin to rise, and soon form nearly a right angle with the stem. Later still, when the buds are fully developed and begin to open, the angle is lessened to about forty-five degrees; while the fruits, when mature, are, for the most part, nearly or quite erect. Thus the flowers, or at least the ovaries, from the time of their formation to their fruiting, traverse, twice over, the arc of a circle of nearly ninety degrees. What advantage the plant gains by these movements it might be difficult to say. Possibly the movements may have some relation to those which are known to pertain to the stamens and style. Observations during the growing season, by any one having the opportunity, would no doubt bring out some interesting facts.

Cornell University.

A. N. PRENTISS.

Growth of Exogens. III.—This subject is one of such importance to science that I feel anxious to put before the botanists of the country all the information that comes into my possession.

In a conversation with one of the professors of Washburn College, Topeka, Kansas, on the growth of Exogens, he informed me that for some years he had charge of the trees upon the college grounds.

In order to get shade as soon as possible, the cottonwood (*Populus monilifera*) had been set alternating with other trees, with the design of removing the cottonwoods as they grew large enough to interfere with the growth of the more desirable trees.

In that locality a dry season occurs with marked constancy, be-

ginning about the first of July and ending about the first of September, while September is usually a wet and warm month. In watching the remarkable growth of the cotton-woods, the professor's attention was drawn to what he thought was a check in their activity in the latter part of the dry season, and the pushing of the terminal buds in September and early October. He became deeply interested in what he regarded as an abnormal condition, and watched with great care until he was convinced that a new, or second tube of wood was formed during this second growth. To test the matter fully he examined cross-sections of some branches whose age he knew, and found that the number of concentric rings exceeded the number of years they had been growing.

In 1877 the dry season set in earlier, commencing about the 20th of June and ending about the 10th of September. This year was peculiarly well suited to testing the truth of second growth, as the dry season was succeeded by wet and warm weather. As soon as frost set in and vegetable growth had ceased, he made cross-sections of several young branches and found that two distinct tubes of wood had been added during the year.

In further proof of the second growth hypothesis, I add the observations and experiments of Désiré Charnay, who is now exploring the ruins of Central America. He had grave doubt as to the great antiquity assigned to some of the ruins that had been laid bare; and he learned, moreover, that the conclusions had been arrived at by counting the rings in the cross-sections of large trees which had grown upon the ruins, some of which exhibited rings enough to indicate that the trees were 2,000, 2,500 and even 3,000 years old—calculating upon the basis that one ring is made in a year. Mr. Charnay, had his attention drawn to the investigation of the one ring theory in cutting down a sapling which he knew to be eighteen months old, and on whose cross-section he counted 40 concentric rings, making more than two for every month of the plant's life. These observations were followed up by Mr. Charnay, with the same comparative result, *i. e.*, that more than one tube of wood is made during the year; hence he was forced to the conclusion that no reliance could be placed upon that mode of determining the date of the ruins.

On a careful examination of the mangrove I was led to the belief that exogenous growth in regions of no frost is very different from that in the regions of frost, where most of our trees make but one *distinct* ring. I am sure that most of them during some seasons make indistinct rings.

The mangrove puts forth a very vigorous growth, then rests apparently from exhaustion, having formed terminal buds in all its branches. After a short period of rest it pushes its buds and a new growth takes place; then, after another period of great activity, there ensues another rest, and so on. In each case a new tube is formed, so that two or many may be made in a year.

I have procured from Southern Florida and Southern Texas specimens of many sorts, all of which confirm my belief in the hypothesis that our exogens in regions of frost, as well as in the Tropics may,

and frequently do, make two or more distinct tubes of wood in one growing season.

White Plains, N. Y.

O. R. WILLIS.

Concentric Annual Growths.—There is no connection between the longitudinal (branch) growth of plants, and the generation of the cells which form the annual layers of wood in the trunk. *Quercus Robur* often has two distinct periods of longitudinal growth the same season in Europe, and in our country nearly always three—but I have never seen more than twelve annual circles of wood in a twelve-year old tree, though I have seen and counted many when cut down for poles at that age.

THOMAS MEEHAN.

Teratological Notes. (From observations made during the season of 1881).—*Symplocarpus foetidus*, Salisb., with two spathes, one within the other, the opening of the inner facing the back of the outer; no spadix. Also a specimen of the same plant with a tuft of well-developed leaves from the centre of the spathe, in place of the usual spadix.

Podophyllum peltatum, L., with a single peltate leaf, having a flower-bud about one inch below it, and with one of the bud-scales at the surface of the ground bearing at its summit a small sub-peltate leaf. Also a specimen of the same plant with three peltate leaves; two of these forking above the insertion of the first, and bearing the flower in the axil.

Hepatica triloba, Chaix., with four involucre leaves, the outer of which was enlarged, and evidently three-lobed.

Claytonia Virginica, L., with unequally bifid, or slightly lacinate petals.

Houstonia caerulea, L., one flower having six sepals and six petals, and two or more flowers with five sepals and petals, growing close together, but not from the same root. The six-parted one had also a four-parted flower on a branch of the same stem. Also, in another locality, a plant with a three-parted flower.

Ranunculus bulbosus, L., with the principal stem flattened, about one-half inch wide, and terminating in a distorted head of fruit.*

Also a scape of *Taraxacum* deformed in a very similar manner to the above.

Plantago lanceolata, L., bearing two diverging spikes from the summit of the same scape.

Vesbasum; evidently a hybrid, and probably *V. Blattaria*, L., fertilized by *V. Lychnitis*, L. It had the general appearance of the former, but tended to branch more paniculately, and to have more flowers (about 4) from the axil of the same bract. The stem was slender, with the leaves more tapering and more woolly than in the last, and the flowers were also slightly less. The pods did not seem to develop fully, and, as far as observed, no seed perfected.

* Fasciation in this species, as well as in *repens* and *arvensis*, was more than ordinarily common in the vicinity of New York last spring.—EDS.

Cirsium lanceolatum, Scop., with pure white flowers.

A seed of *Fragaria Americana*, L., with triquetrous wing.

Taraxacum, with scape bearing about midway a foliaceous bract, and a similar one just below the involucre.

Concordville, Pa.

WILLIAM TRIMBLE.

Heterocentron roseum of the conservatories acts in the same exquisite manner as its cousin *Rhexia*. The eight stamens are in two sets, one set dehiscent before the other. In the bud, the anthers are so thrown over that their backs are against the style. The long connective is, at its union with the filament, bifurcated into two diverging "setae" in the outer stamens, while the other set is devoid of these appendages. I have been delighted to find that, upon pressing the bellows-like anther with a blunt pencil, the pollen was ejected to a full inch in distance and with great force.

W. W. BAILEY.

Migrations of Plants.—Some years ago I sold a piece of ground through which a street was made, forming in one part, by damming the surface water, a small marsh. A few years afterwards I found one plant of *Typha latifolia* growing there. It did not at that time grow naturally within many miles. I feel as sure as we can be of most things, that the seed did not get there by human agency. I had seen snipes in the little marsh, and I concluded it the most probable that the seed had been brought with the mud in the feet of aquatic birds. It seems possible for many plants to be distributed by this means, and possibly the *Marsilia quadrifolia* found above Dedham by Mr. Clapp, may have been introduced to the Charles River in that way. If this should prove a sound guess, it may come about that the Connecticut plant is a comparatively modern introduction through the agency of some larger arctic water bird which wandered there from Siberia, where the plant is known to grow, or some nearer place perchance, where it has not been collected yet. It seems to me that when plants which may be easily distributed are found but in limited localities, we may act on the presumption that they are recent introductions. I think it would help geographical botany very much if the first appearance of even common plants in any new locality were placed on record. In this respect, Mr. Lester F. Ward's notes on the flora of the vicinity of Washington seem to my mind, very valuable.

THOMAS MEEHAN.

A large Grape-vine.—Many years ago I found a colony of large grapes-vines, supposed to be *Vitis Labrusca*, L., in Wayne County, Ohio. A few years ago I revisited the spot for the purpose of making measurements. The trunks (for such they were) ranged from three inches to over a foot in diameter, the longest one having a circumference of thirty-seven inches at about four feet from the ground.

Ames, Iowa.

C. E. BESSEY.

Hieracium aurantiacum, L.—This is generally considered as an introduced species, but lately there seems to have been considerable doubt expressed on the subject by many observers. During the summer of 1878 I found it growing in the wild region near Port Henry, N. Y., where few introduced plants had yet gained a foothold. Others have also noted its occurrence in situations that almost preclude the possibility of its having been introduced. The locality mentioned was quite thickly wooded and broken with cliffs and outcrops of limestone. In the immediate neighborhood were none but native species such as *Asplenium ebencum*, *Camptosorus rhizophyllus*, *Linnaea borealis*, etc. It would be of interest to know the character of the surroundings in other localities where it has been observed.

ARTHUR HOLLICK.

Hieracium aurantiacum.—I see in the October number of the TORREY BULLETIN a notice by John H. Redfield of *Hieracium aurantiacum*. He says he found the plant among the Catskills on the 26th of August, and that it was then just coming into flower, the scapes being from 3 to 6 inches high. The locality he describes must be the same at which I found it much earlier in the season. About the 4th of July it was in full bloom, with scapes from 6 to 12 inches in height. By the last of July the bloom was over. Up to that time the grass had not been cut.

Germantown, Pa.

MARY S. COPE.

Epigaea repens.—Mr. James L. Bennett writes us that this plant was in flower in Providence, R. I., during the last week in December.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at the Herbarium, Columbia College, Tuesday evening, Nov. 8th, 1881, the President in the chair and fifteen persons present.

Dr. Kunze exhibited an ear of corn raised from a seed alleged to have been taken from a Peruvian mummy, and which was supposed to be 1,500 years old when planted. This gave rise to a lengthy discussion on the vitality of seeds, at the conclusion of which Dr. Kunze announced that he would prepare a paper on the subject for the next meeting.

The President exhibited an additional collection of plants from the Western Territories.

Judge Brown presented for the Club's herbarium a number of adventive plants from ballast grounds near the city.

Three persons were elected active members.

At the regular meeting of the Club held Tuesday evening, Dec. 13th, the President occupied the chair and twenty-three members were present.

Dr. Kunze read a paper on the "Vitality of Seeds," which we hope to print at some other time.

CORRECTION.—By an oversight in our December number, *Omphalodium Hottentottum* **Arizonicum* was indicated as a variety, instead of a sub-species as it should have been. *Pertussaria*, in the same article, should read *Pertusaria*.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. IX.]

New York, February, 1882.

[No. 2.]

On a Hybrid Oak near Keyport, N. J.

By N. L. BRITTON.

(Plates x, xi and xii.)

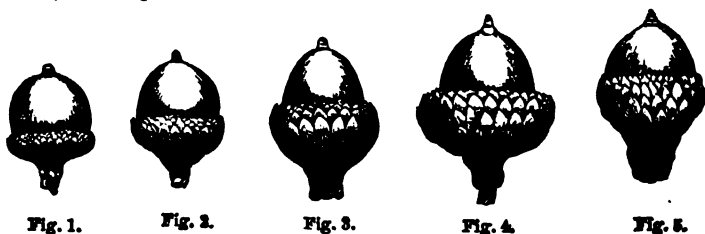
In the early part of September, 1881, Messrs. W. H. Rudkin and Wm. Bower, while botanizing between South Amboy and Keyport, New Jersey, noticed a number of oak-trees whose leaves and acorns seemed different from those of any species known to grow in the vicinity of New York, and which apparently indicated every form of outline and lobing between those of typical trees of *Quercus nigra*, L., and *Q. Phellos*, L., which grew in company with them.

Since the date of the discovery of the trees, two other excursions have been made to the locality by members of the Torrey Club, and the result has been a confirmation of the impression first formed, and all who have seen them are of the opinion that they are hybrid forms between the black-jack and willow-oaks, and, as such, have not been noticed in our botanical literature up to the present time, as far as I can ascertain.

The number of trees observed was about ten, of widely different ages, indicating either that the process of hybridization has been in progress at different times, or, that if it all took place the same season, some of the acorns have germinated sooner than others.

The outlines and modes of venation of the leaves of the new hybrid are exactly represented in the accompanying plates. These show the principal variations towards the unlobed or slightly lobed leaves of typical *Quercus nigra*, L., and the much-lobed leaves of what Dr. Engelmann regards as a juvenile, sterile state of the same tree, but which is often seen in large fruiting specimens—the *Q. ferruginea* of Michaux. These leaves vary in outline from lanceolate or oblong unlobed leaves (Figs. 2 and 6), not unlike those of *Q. imbricaria*, Michx., to those where a slight, obtuse lobe appears on one side (Fig. 3); or slight on one side and more pronounced on the other (Fig. 4); or well marked on both sides (Figs. 5 and 7); or obtuse on one side and acute and bristle-pointed on the other (Fig. 9); or acute and bristle-pointed on both sides (Fig. 10), to the leaves of *Q. nigra*, L. (Figs. 8 and 11). It appears as though the specimens reproduced on Plates x and xi were transitions towards the slightly lobed or unlobed *Q. nigra*, L., while the two lower figures on Plate xii indicate transitions towards the more lobed forms; and the figures have been grouped with regard to this fact. The petiole is also seen to vary, though not very prominently shown in the leaves figured, from very short in *Phellos* to a considerable length in *nigra*. The amount of pubescence on the lower surface of the leaves, very slight or absent in *Phellos*, varies on leaves of the hybrid to the heavy, rusty covering of *nigra*.

The acorns vary considerably. Those of *Phellos* are nearly globular, with a low, saucer-like cup (Fig. 1 in the cut); in *nigra* ovoid or oblong, with a top-shaped cup (Fig. 5). In the hybrid they vary on the different trees; the one represented in Fig. 2 came from the tree bearing the leaves figured 2 and 3 in Plate x; it is seen to be slightly longer than the acorn of *Phellos*, and to have a slightly deeper cup with broader scales. The acorn represented in Fig. 3 grew with leaves like those figured 4, 5, 6 and 7; this is much deeper-cupped and longer, with broader scales. The trees which bore leaves like those figured 9 and 10, had acorns like the one represented in Fig. 4 of the cut. This is short-ovoid in shape, with a very wide broad-scaled cup, and does not seem to be intermediate between those of the parents, but is peculiar to itself.



The primary venation, which is simply pinnate, with short veins in *Phellos*, and irregularly-pinnate, with veins of very unequal length in *nigra*, presents every variation between the two in the leaves of the hybrid.

The Plates do not represent, by any means, all the variations which were found; but are only intended to illustrate the most common forms which occur.

The bark of the hybrid trees is most nearly like that of *nigra*, being black and quite rough, though varying somewhat in the different trees.

I have thought it not improper to name this hybrid oak—probably the plainest of them all—after the gentleman who first discovered it, Mr. W. H. Rudkin.

In connection with this subject, I take the liberty of making the following extracts from Dr. Geo. Engelmann's paper on "The Oaks of the United States," in order to enumerate the hybrids already noticed in this country. Dr. Engelmann says: "White oaks and black oaks are too distinct to be crossed. * * * Among the white oaks, hybrids seem to be much rarer than among black oaks. Of the former, I have thus far been able to trace but 3 forms only, which I take to be hybrids, and all of them point to *Q. alba* as one of the parents.

Q. alba x *macrocarpa* is sent by M. S. Bebb from Northern Illinois.

Q. alba x *stellata*. A specimen from the same careful observer must, I believe, be referred here.

Q. alba x *Prinus*. A single tree, now unfortunately destroyed, was observed by Dr. G. Vasey near Washington.

The hybrid black oaks are much more numerous or * * *

* *Trans. St. Louis Acad. Sci.*, Vol. iii, Nos. 3 and 4.

more have thus far been noticed. * * * Our black oak hybrids are the following :

Q. Catesbaei x *aquatica* ; *Q. sinuata*, Walt. It is quite probable that in the tree observed by Dr. Mellichamp, * * * near Bluffton, S. C., we meet with Walter's obscure and long ignored species.

Q. Catesbaei x *laurifolia*, a late discovery of Dr. Mellichamp, is found in the same neighborhood.

Q. imbricaria x *nigra* ; *Q. tridentata*, Eng. in Hb. A single tree, rather small * * * was found by me in the autumn of 1849 on the hills 6 miles east of St. Louis.

Q. imbricaria x *palustris* was observed by me a few years ago, 8 miles west of St. Louis.

Q. imbricaria x *coccinea* was first described and figured by Nuttall about thirty years ago under the name of *Q. Leana*. The original tree was discovered by Mr. T. G. Lea near Cincinnati, and is still in existence.

Q. ilicifolia x *coccinea*, Robbins, discovered by Dr. Robbins at Uxbridge, Mass., in 1855."

Quercus heterophylla, Michx., regarded by Dr. Engelmann as a hybrid between *Q. Phellos* and *coccinea*, or some other oak with deeply lobed leaves, is considered by Mr. I. C. Martindale,* who has given the matter much careful study, to be worthy of specific rank, and is excluded from the foregoing list.

New Species of Compositae chiefly Californian.

By EDWARD LEE GREENE.

VIGUIERA PARISHII.—Shrubby, much branched and scabrous-hispid ; leaves mostly opposite, an inch or two long, including the short petiole, ovate, acute, the margins with a few coarse triangular teeth ; flowering branches long and flexuose, nearly naked above, and each bearing a single head ; involucre short, its scales ovate-lanceolate ; rays about 10 ; receptacle convex ; bristle-like awns of the pappus about equalling the finely ciliate akenes, and deciduous ; the intervening scales apparently persistent, numerous and acute.

Collected at San Luis Rey, April, 1881, by the Messrs. Parish (No. 963).

Dr. Gray writes that he has the same from the Colorado Desert, collected by Mr. W. C. Wright.

HEMIZONIA (HARTMANNIA) HEERMANNI.—Near *H. virgata*, but densely short-hirsute and very viscid-glandular throughout ; stem 1-3 feet high, parted below the middle into many graceful wand-like, loosely racemose or racemose-paniculate branches ; cauline leaves an inch or more long, linear, entire, those of the sterile branchlets oblong-linear, 2-3 lines long and crowded, of the flowering ones still smaller, bract-like, ovate-oblong, scattered and more or less appressed, each tipped with a truncate gland which is nearly or quite sessile ; heads of medium size ; rays 5-8, broad, 3-4-toothed, bright yellow and showy ; disk-flowers 10-15, their corollas glandular ; fertile

* Notes on the Bartram Oak, *Quercus heterophylla*, Michx., by Isaac C. Martindale, Camden, 1880.

akenes black or nearly so, more or less tuberculate, and with a prominent curved beak; sterile ones half enclosed by the chartaceous chaff of the flat receptacle.

Tehachapi Pass, Kern County, near Keene Station, abundant in groves of *Quercus Douglasii*; collected by Dr. Parry and the writer, Sept. 9, 1881.

An interesting discovery, as being a near relative of the peculiar *H. virgata*, Gray, from which species it differs by its habit, pubescence, sparse foliage, larger heads and dark tuberculate akenes.

I distributed too early, a few specimens of this fine novelty under the name *H. parvifolia*, n. sp., and Dr. Gray, having seen one of these, kindly informs me that a fragment in his herbarium, collected by Heermann and referred by Durand to *H. macradenia*, and another collected by Rothrock (No. 176) and by that author referred to *H. ramosissima*, both of which Dr. Gray had put in with *H. virgata*, are of this present species. At the suggestion of Dr. Gray I dedicate the species to Dr. Heermann who first collected it, the name at first proposed being hardly a distinctive one.

HEMIZONIA (HARTMANNIA) PARRYI.—Simple below, corymbosely branched above, rigid, a foot or two high, sparingly hirsute and minutely glandular, the glands yellow, resinous, and nearly sessile; cauline leaves remotely pinnatifid or toothed, those of the branches entire, linear-subulate, rigid and, with the long involucrel bracts, spinulose-tipped; rays numerous, exceeding the disk, linear-oblong, 2-toothed; akenes black and smooth, the sterile ones of the disk bearing a pappus of about 3 (rarely 4 or 5) narrowly-linear chaffy scales which taper to a slender point and equal, or even exceed the corollas; chaff of the convex receptacle thin, villous on the margin, acute, obtuse, or sometimes with a resinous-glandular tip, but never at all pungent.

At the Calistoga Springs in the upper part of Napa Valley; collected by Dr. Parry and the writer June 30, 1881, and, again in July, maturer and better specimens by Dr. Parry. Since this description was written Dr. Gray has sent word that the species has long existed in the Cambridge herbarium, being Dr. Torrey's No. 243 from Napa Valley, and Bolander's No. 2614 from Clear Lake, and that it had been referred as a variety to *H. Fitchia*, Gray.

In aspect it is almost precisely like *H. pungens*, T. & G., from which its fragrant, balsamic glandulosity, remarkable pappus, soft chaff and black akenes abundantly distinguish it.

Hemizonia luzulaefolia, DC., var. LUTESCENS, differs from the ordinary, and hitherto only known form of the species in having bright yellow leaves. It grows in great abundance toward the north end of San Francisco Bay, in the vicinity of San Pablo, and at Valejo, where it seems to altogether take the place of the white-flowered type.

HEMIZONIA (CALYCADENIA) SPICATA.—Slender, a foot high, simple or branched, setose-hirsute; heads sessile, spicately crowded on the whole length of the stem and all the branches; flowers white: ray-akenes densely clothed with long, appressed, villous hairs; those of the disk less silky and with a pappus of 10 unequal, subulate, awn-pointed scales,

Collected at Milton Station, in the neighborhood of Stockton, Oct., 1881, by Dr. Parry.

The specimens are rather old and quite destitute of leaves; but the densely spicate heads, and very silky akenes indicate a good species, to come in between *H. Douglasii* and *H. multiglandulosa*.

It is glandular, after the manner of the group, and exhales an odor more agreeable than that of either of the aforementioned species.

CHAENACTIS SANTOLINOIDES.—A caespitose perennial, the stems; less than a span high, and, with the foliage, densely white-woolly; leaves linear to linear-lanceolate in outline, 1-2 inches long and 1-3 lines wide, somewhat quadrangular with the numerous, small, crowded and imbricated leaflets; heads large, solitary, on naked peduncles 5-8 inches high; corollas apparently white; pappus of 10-15 very unequal, oblanceolate scales.

Collected by S. B. and W. F. Parish (No. 1045) in the San Bernardino Mountains, August, 1881.

Only two or three specimens were obtained and these long past their flowering. A few ripe akenes were detected adhering to the woolly and matted leaves, from which the peculiar character of the species was made out. It is near to *C. Douglasii* and *C. Nevadensis*, but differs from them, and all other known species, in its very numerous and very irregularly-unequal pappus-scales.

RAILLARDELLA PRINGLEI.—Stem a foot and a half high, leafy at base, naked and glandular above, leaves linear, glabrous, 3-4 inches long, some of the radical ones remotely and obscurely serrate; head solitary, terminating the long scape-like stem, large (an inch high and about 40-flowered), with about 10 broadly cuneate, deeply 3-cleft rays of a deep yellow or orange-color; scales of the involucre distinct to the base; rays fertile, and bearing a pappus similar to that of the disk-florets, of about 15 rather slender and soft plumose bristles equalling the disk-corollas.

High mountains west of Mt. Shasta; collected by C. G. Pringle, in August, 1881.

Dr. Gray, in Bot. Cal. 1, 618, in describing his *Raillardella Muirii*, looked on it as constituting a well marked second section of the genus, distinguished from the first by its leafy stem, and involucre scales distinct to the base. The species now described appears to destroy Dr. Gray's proposed sections, inasmuch as it combines the naked, scape-like, monocephalous stems of the first, with the distinct involucre scales of the second. But *R. Pringlei* surprises us with large, showy ray-flowers, which, however, ought not to have been so unexpected, for in some of Dr. Bolander's duplicates of *R. scaposa*, I find a few rays; but they are smaller, and of a paler yellow than those of this new species.

Hieracium aurantiacum has been collected here for the past two seasons, but always in situations which seemed to indicate that it was an introduced species. It has been found growing on Prospect Hill (a hill situated in the centre of the city and but thinly settled), in open lots and by roadsides, in the grounds of Yates' Castle and in Oakwood Cemetery; but nowhere else that any of us members of the S. B. C. know anything of.

MARY OLIVIA RUST.

New North American Fungi.

By J. B. ELLIS.

J. B. Ellis
by W. B. Ellis
PAXILLUS AURANTIACUS.—Pileus more or less excentric, concave, innate, tomentose, dirty yellow-brown, $1\frac{1}{2}$ '– $2\frac{1}{4}$ ' across, margin involute when young, expanded when mature; flesh dirty yellowish-white, compact in the centre; lamellae bright orange, paler at first, deepening to orange-red when dry, decurrent, 4–6-times forked, edges entire, obtuse, scarcely exceeding $\frac{1}{8}$ ' wide, moderately crowded; stem solid, spongy, short, 1' long by $\frac{1}{8}$ '– $\frac{1}{4}$ ' thick, subequal, mostly curved, covered with a short rusty-brown tomentum; spores white, oblong-elliptical, .0002'x.00015'. Pileus subviscose in wet weather.

On moss-covered decaying cedar logs and stumps in a swamp, November, 1881.

AGARICUS (PLEUROTUS) NIPHETUS.—Pileus lateral, subimbricated thin, flabelliform, spatulate-reniform, 2'–3' wide and long, narrowed to the sessile base, but without any distinct stipe, convex, innate-tomentose, snow-white throughout, becoming yellowish in drying; lamellae narrow, unequal, crowded; spores white, nearly orbicular, .00015'–.000275' in diameter with a large nucleus, or two or three small ones.

On decaying logs and stumps of pine and cedar in a swamp, Oct., Nov.

PEZIZA (SARCOSCYPHA) AURANTIOPSIS.—Sessile, about one inch across, with a coarse, felt-like, black-brown mycelium at the base, matting together the leaves, etc., on which it grows; the outside of the cup also coated with coarse (.00025' diam.) brown, smooth sparingly-branched, continuous hairs; disk clear pale yellow, nearly sulphur-yellow, becoming dull orange when dry; margin thin, pale, narrow, erect; flesh white, thick ($\frac{1}{8}$ '– $\frac{1}{4}$ '), firm, elastic, dry; asci cylindrical, subtruncate above, .0013'–.0014'x.0006'; paraphyses stout, septate, slightly thickened above; sporidia oblong-elliptical, granular, .0009'–.001'x.0006', epispore smooth.

On the bare soil and on decaying wood and leaves in low, sandy, oak and pine woods, Sept. 1881.

PEZIZA (SARCOSCYPHA) SCUTELLOIDES.—Sessile, $\frac{1}{8}$ '– $\frac{1}{4}$ ' across, outside sparingly clothed, and margin fringed with dark brown, 1–3-septate hairs; disk, bright red, as in *P. scutellata*, L., which this outwardly much resembles; asci cylindrical sessile, .006'x.0007'; paraphyses stout, clavate, thickened above and filled with orange-colored granular matter; sporidia uniseriate, globose, smooth, with a single large nucleus, about .0005' in diameter.

On damp ground, West Chester, Pa., June and July, 1881, Haines, Everhart, Jefferis and Gray, Nos. 165 and 180.

PEZIZA (DASYSCYPHA) LATEBROSA.—Stipitate, yellowish-white, .015' high, clothed throughout with short, spreading, glandular hairs; disk concave, .01' across, dull white, with a faint tinge of rose-color; margin incurved and fringed with straight, rough hairs, faintly septate below, obtuse or slightly enlarged above, and about .002' long; asci clavate-cylindric, .001'–.0013' long by .00015' wide; paraphyses stout, linear, not pointed above; sporidia biseriate, simple, hyaline, .00015'–

.0002' long. Resembles *P. virginea*, Fr., but that is whiter and taller, with capitate hairs and lance-pointed paraphyses, and has sporidia .0003' or more long.

On the inside of a moldy pine box in a cellar, June 15, 1881.

PEZIZA (DASYSCYPHA) RHABDOCARPA.—Scattered, sessile, .02' in diameter, thin and of a close, vesiculose-cellular structure, margin fringed with short, black, fasciculate, obtuse, clavate-capitate hairs; asci oblong-cylindrical, sessile, obtusely pointed above, .0025' x .0003'-.0004'; paraphyses stout, scarcely thickened above; sporidia linear, multinucleate (becoming multiseptate?) yellowish, nearly as long as the asci, and a little over .0001' thick.

On dead twigs of *Comptonia*, Sept., 1881.

PEZIZA (TAPESIA) PHLEGMACEA.—Gregarious, sessile, orbicular, plane, thin, white, soft, seated on a subiculum of delicate, creeping, white, loosely-matted threads; asci cylindric-clavate, abruptly pointed above, .003' x .0005'; paraphyses scarcely thickened above; sporidia linear-fusiform, attenuated below to a slender point, .0013 x .0001'.

On decaying *Magnolia*, June to Sept.

PEZIZA (MOLLISIA) ABDITA.—Disk orbicular, pale, .028'-.03' in diameter, with a narrow, jagged, membranaceous margin, protruded when fresh through a narrow slit in the epidermis, from which it is again withdrawn and entirely disappears when dry; asci sessile, oblong-cylindrical, .0015'-.002' x .000175'-.0002'; paraphyses thickened above; sporidia biserial, clavate-oblong, about .0004 x .0001'. Resembles *P. protrusa*, B. & C., in habit. When dry its presence is indicated only by a narrow slit in the epidermis.

On fallen petioles of *Juglans regia*, June.

DIATRYPE LATERITIA.—Seated in the bark and not penetrating to the wood, which is not marked or discolored by it at all. Stroma at first concave and of a dull brick-red color, at length convex and olivaceous with a distinct margin like a *Helotium* $\frac{1}{8}$ - $\frac{1}{4}$ ' in diameter, thickly dotted with the papillate, black ostiola; perithecia carnoscartilaginous, small and numerous (50-75) in two layers near the surface, leaving the lower part of the stroma entirely barren; asci clavate-cylindrical, .004' x .0003; sporidia overlapping, lanceolate, curved, pale brown, 3-septate .0008'-.001' x .0002'.

On dead limbs of *Carpinus* (?), West Chester, Pa., Aug. 1879, Haines, Everhart, Jefferis and Gray, No. 2.

LOPHIOSTOMA VERMISPORA.—Perithecia scattered or subgregarious, depressed-spherical, .006' in diameter, seated under the epidermis, which is pierced by the stout, black, narrowly-compressed ostiola; asci clavate-cylindrical, .008' x .0005'-.0006'; sporidia verniform, gradually tapering towards the base, about 7-septate and slightly constricted at the septa, yellowish or nearly hyaline, each of the divisions with 1-2 large nuclei, .003'-.0035' long by .00015'-.0002' thick.

The sporidia are those of *Ophiobolus* but the compressed ostiolium is that of a *Lophiostoma*.

On old stems of *Oenothera biennis*, August.

DIAPORTHE APICULOSA.—Perithecia buried in the substance of the stem; ostiola rather stout and slightly projecting, so as to roughen the surface of the stem; spore-bearing part of the asci

.0016'-.0003'; sporidia biseriate, yellowish, elliptical, 2-3-nucleate, with a faint apiculus at each end, .00035-.0004'x.000175'. Grows only on the root and basal portion of the stem.

On decaying stems of *Erigeron Canadense* lying on the ground, Aug.

ASTERINA RAMULARIS.—Perithecia subcuticular, orbicular, .0008'-.001' in diameter, or subelongated, scattered or subconfluent, with a very scanty mycelium; margin of a distinct radiate-cellular structure; asci oblong, spore-bearing portion .002'x.001', stipitate at first, stipe at length absorbed; sporidia 8, crowded, elliptical, coarsely granular, with 1-2 large vacuoles at first, about .0006'x.0004'.

Perithecia permanently covered by the epidermis, which is blackened above them.

On dead twigs of *Lindera Benzoin*, West Chester, Pa., Oct. 1881, Haines, Everhart, Jefferis and Gray, No. 326.

NECTRIA SQUAMULOSA.—Gregarious, minute, .004' in diameter, ovato-globose, covered, excepting the brownish, obtuse, slightly prominent ostium, with a light-colored, squamulose coat; asci lanceolate, narrowed and subtruneate above, .0013'x.00025'; sporidia biseriate, clavate or cylindric-oblong, .0002'-.0003' long by rather less than .0001' wide, binucleate, probably becoming uniseptate.

On decaying wood of a fallen limb, No. 81.

CERATOSTOMA CAPILLARE.—Perithecia capillary, nodulose, with short, spreading, hyaline hairs below, scarcely enlarged at base; asci elliptical, .0013'x.00035'; sporidia 8, crowded, fusiform, nearly hyaline, indistinctly nucleate, straight or slightly curved, .00045'-.00055'x.000125'.

On decaying sterile catkins of *Alnus serrulata*, June.

DINEMASPORIUM CRUCIFERUM.—Minute; marginal fringe of dark brown bristle-like hairs, .003-.0035' long; spores pale flesh-color in the mass, oblong, slightly curved, .0003'-.00035'x.000125', with a slender, oblique, bristle-like hair, about as long as the spore itself, projecting from each end, and a shorter one from near the middle of the convex side, and often another extending in an opposite direction from the middle of the concave side. Sometimes two hairs project from the convex side of the spore.

On decaying culms and leaves of various grasses, June.

VOLUTELLA COMATA.—Receptacle disciform, orbicular, .0017'-.002' in diameter, attached by a central point and easily separating from the matrix; margin fringed with slender, septate, minutely-roughened, slender-pointed hairs; mass of spores flesh-colored, and convex when fresh; spores fusiform, .0005'-.00035' long. Differs from *V. ciliata*, Berk., in its larger spores.

On fallen petioles of *Robinia*, June.

Unless otherwise stated, the above-described species were collected at Newfield, N. J.

Fern Notes. III.

By GEO. E. DAVENPORT.

Asplenium ebenoides in *New York State.*—The discovery of this rare fern near Poughkeepsie was recorded by Mr. Clarence Lown in the BULLETIN for September, 1880. Mr. Lown, in company with

Mr. Henry Booth, has now had the good fortune to find another plant of the same species in the limestone region of Saugerties, in Ulster County.

The plant was found on the 15th of November, 1881, growing in a clump of *Camptosorus*.

Mr. Lown writes that the limestone-loving ferns *Asplenium Rutamuraria* and *Pellaea atropurpurea* were plentiful in the vicinity, but that there was no *ebeneum* nearer than fifteen feet. That distance, however, is plenty near enough (as, indeed, a much greater distance would be), to admit of the intermixture of spores, and consequent hybridization, if to that source the origin of *ebenoides* is really to be attributed.

In the specimens previously recorded, Mr. Lown described the venation as being more or less anastomose. This is the case in the frond which I received from Mr. Lown at that time, and also in at least one of my specimens from Alabama; but in the present plant the venation is everywhere free, while the plant itself looks very much like a form of *A. pinnatifidum* (a species not yet, but which ought to be, found within the limits of New York State) with black stipites, the tips of the fronds being less prolonged than usual.

It is to be hoped that some one, with means and opportunities for investigation, will yet be able to settle the question of this fern's origin; for, while the evidence is strongly in favor of the hybrid theory, it is by no means conclusive.

In view of the possibility of such an investigation the following points are presented here as having an important bearing upon the question:

1.—In every instance thus far, wherever *ebenoides* has been found, *Camptosorus* and *Asplenium ebeneum* have both been present.

2.—The affinity of certain characters possessed in common by *ebenoides* and *Camptosorus*—the prolonged, attenuated proliferous apices, anastomosing venation (BULLETIN *l. c.*), and now the significant position in which Mr. Lown found his last plant—point to *Camptosorus* as the mother plant; while, on the other hand, certain characters possessed in common by *ebenoides* and *Asplenium ebeneum*—the deeply pinnatifid, sometimes nearly, or quite pinnate (at least below) laminae, and ebeneous stipites—point to the latter species as the probable source from which hybridization proceeded: the inference from these facts, and the constant presence of *A. ebeneum* and *Camptosorus* being that the prothallus of some *Camptosorus* had become fertilized from the prothallus of an *ebeneum*, resulting in the production of a hybrid combining in itself the characters of both species.

3.—The extremely variable and irregular form of *ebenoides*—the often grotesque variation appearing as the result of two opposing internal elements struggling for the mastery—is exactly what might be expected from the hybridization of the two ferns mentioned.

Aspidium Filix-mas, Swz., in Arizona.—The discovery of *Cheilanthes tomentosa*, Link., *Aspidium patens*, Swz., and *Woodwardia radicans*, Smith, in Arizona, by Mr. C. G. Pringle, has already been recorded in the BULLETIN for August, 1881; I am now able to record

the additional discovery of *Gymnogramme triangularis*, Kaulf., and *Aspidium Filix-mas*, Swz., by the same indefatigable collector. The first was collected in April on the Santa Catalina, and the last on Mt. Washington, in the Santa Rita Mountains, in June, 1881.

This discovery of *A. Filix-mas* so near to California renders its presence in that State probable, and will encourage California botanists to search for it. Some forms of *A. rigidum*, var. *argutum* run very near to, and have frequently been mistaken for it, but no authentic specimens have as yet been received from California.

The species is most readily distinguished from *argutum* by the character of the serrated margins, these *never being spinulose* as in the latter species, which resembles *A. spinulosum* in this respect more than it does *Filix-mas*.

The under surface is usually more chaffy in *Filix-mas* than in *argutum*, the laminae narrower below, and the scales at the base of the stipes more or less ciliate-toothed, as pointed out by Prof. Eaton in his splendid work on our North American Ferns.

Mr. Pringle has also collected in Arizona, besides the ferns already mentioned, *Notholaena Grayi*, *N. Lemmoni*, *Gymnogramme hispida*, a very pubescent form of *Pellaea atropurpurea*, *Cheilanthes Lindheimeri*, *C. Fendleri*, *C. Eatoni*, and others,* while among his ferns from Oregon and California are *Polypodium falcatum*, very large forms of *P. Scouleri*, *Phegopteris alpestris* and *Aspidium Mohrioides*.

The excellence of Mr. Pringle's collections is now too well known to need any special commendation. He will probably make some arrangement before returning to the Pacific Coast (being at Charlotte, Vermont, at present) by which those who may desire sets of his ferns can obtain them.

An unusual form of Asplenium ebeneum.—From Miss Kate Furbish, of Brunswick, Me., comes a very interesting form of this species, one frond, measuring about 12 inches in length by 2 in breadth across the middle, and having unusually narrow, deeply-serrated pinnae, 1 inch long, less than $\frac{1}{2}$ of an inch in breadth at the base, broadening to about 3 lines at the centre where they are still more deeply serrated, the lobes again serrated, and then tapering gradually into an acute tip. The pinnae are obliquely set to the rachis, and some of them lose their auricled bases altogether.

The specimen is apparently one of those variations which are not likely to occur twice upon the same plant, and it does not, therefore, seem worth while to give it a name. Miss Furbish is rendering a splendid service to the Maine flora by a series of admirably executed and accurate analytical illustrations from nature, intended to include

* Mr. Pringle also collected, early in 1881, a few specimens of the *Woodsia* which Prof. Eaton has referred to *W. Mexicana*. Later, Mr. Lemmon sent the same fern to me with the name *W. Plummerae* attached, with a request that I should describe and publish it. This I declined to do. If now the fern which he has published as a new species in the *Botanical Gazette* under that name is the same plant, then it is to be seriously challenged, and I do not believe it will stand. The same *Woodsia* had previously been collected by Mr. Rusby, Mrs. Bagg, Dr. Palmer and Dr. Parry.

the entire flora of the State. It is to be hoped that she will not only be able to complete her "labor of love" but that it may some day be placed where it will remain as a monument to her untiring industry and love for the wild plants of her native State.

Abnormal Botrychium matricariaefolium.—While looking over some duplicates recently I came across a specimen of this fern with a fertile branch growing out from the stipes about 1 inch from its base. The branch had grown out in such a manner as to cause the stipes to diverge from its proper perpendicular course, and to form a curve which gave it the appearance of being forked.

Medford, Mass., Jan. 12th. 1882.

Large Grape-Vines.—In the January BULLETIN, Prof. Bessey gives the measurement of a grape-vine in Wayne Co., Ohio, (supposed to be *V. Labrusca*) of thirty-seven inches in circumference at four feet from the ground. In March last, whilst in Darien, Ga., I rode out to Baisden's Bluff on the coast, some twelve miles N. E. of Darien to see a celebrated grape-vine. It was just in leaf, but from the wood and bark I judged it to be *V. aestivalis*. It grew near to (touching) a large water-oak, and the large trunks clambered up to the top of the tree. I measured it at eight feet from the ground, and found it forty-four inches in circumference. I also measured, in the streets of Darien, two large live oaks, one giving a circumference of twenty-one feet, at three feet from the ground, and the other, eighteen feet at the same distance. I also measured two trees of *Melia azedarach* (pride of India) one eleven and a half feet, the other nine and a half feet, both taken about three feet from the ground. This exotic is a fast grower but the large size proves that this tree must have been introduced in the early settlement of the State.

Aiken, S C.

H. W. RAVENEL.

Notes on the Flora of Newport, R. I.—During the past season I have found a few interesting plants at Newport, R. I. A small patch of *Rhinanthus Crista-galli* grows in a swamp about a mile S. W. of the city. It was probably introduced here.

Epilobium hirsutum, L., is not uncommon in waste ground surrounding dwellings.

Genista tinctoria, L., occurs sparingly on some rocky hills, and *Trifolium hybridum*, L., in fields near the sea-shore. *Iris Virginica*, L., grows abundantly in swamps. *Alopecurus geniculatus*, L., and *Leontodon autumnale*, L., are found everywhere. *Hydrocotyle umbellata*, L., grows in shallow water on the border of Lily Pond. *Bromus mollis*, L., is found in great abundance in a piece of ground near Bellevue Avenue. It grows in such profusion that at a distance it might be taken for a field of grain. The following species also occur here: *Potentilla anserina*, L., *Glyceria acutiflora*, Torr., *Phalaris Canariensis*, L., *Bromus tectorum*, L., *Galinsoga parviflora*, Cav., *Centaurea nigra*, L., *Clethra alnifolia*, L., *Euphorbia Peplus*, L., *Triglochin maritimum*, L., *Arethusa bulbosa*, L., *Habenaria lacera*,

R. Br., *Polygala polygama*, Walt., *Ranunculus Cymbalaria*, Pursh. *Lathyrus palustris*, L., and *Discopleura capillacea*, DC.

Newport, R. I., Dec. 22, 1881.

FRANK TWEEDY.

The White-fruited Blackberry.—In the November BULLETIN G. M. Wilber speaks of finding a white-fruited specimen of *Rubus villosus*, Ait., in New York. This anomaly was found quite commonly on the high lands along the Michigan lake shore at South Haven, Mich., when the country was first settled. It was transplanted to gardens in many places and has spread vigorously under cultivation for many years, constantly maintaining its original character. The fruit is every way equal to the typical black-fruited blackberry, but is inclined to be somewhat sweeter. It is generally known as the "white blackberry." The whole aspect of the plant is peculiar and striking. It deserves to be recognized as a variety in our botanies.

Lansing, Mich., Dec. 29th, '81.

L. H. BAILEY, JR.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at the Herbarium, Columbia College, Tuesday evening, Jan. 11th, the President in the chair and twenty-two members and five visitors present.

Plants Exhibited.—Dr. Barstow exhibited specimens of fruit and leaves of the Japanese persimmon, *Diospyros Kaki*, and flowers of Irish furze. Mr. Charlton sent a collection of plants for the Club's inspection and for deposit in the herbarium. Miss Knight showed several specimens of mosses in fruit, among which was the rare *Buxbaumin aphylla*, Haller, collected at Dedham, Mass.

Some Notes on the Flora of Newport, R. I., by Mr. Frank Tweedy, were read by Mr. Britton.

Mr. Schrenk read a paper on the "Development of the Rootstock of *Dicentra*."

Late Flowers.—Mr. Bicknell stated that he had obtained in flower at Riverdale, between Dec. 25th and Jan. 1st, *Taraxacum Dens-Leonis*, *Callitriche verna* and *Verbascum Thapsus*.

The Constitution and By-laws, as amended at a previous meeting, were passed, and ordered printed in pamphlet form.

One name was proposed for active, and one for corresponding membership.

Election of Officers.—This being the annual meeting, the Club balloted for officers with the following result: President, J. S. NEWBERRY; Vice-President, ADDISON BROWN; Recording Secretary, G. M. WILBER; Corresponding Secretary, BENJAMIN BRAMAN; Treasurer, W. H. RUDKIN; Editor, W. H. LEGGETT; Associate Editor, W. R. GERARD; Librarian, N. L. BRITTON; Curator, P. V. LE ROY.

The President appointed Messrs. Leggett and Gerard a committee on admission of members.

BULLETIN OF THE TORREY BOTANICAL CLUB.

Vol. IX.]

New York, March, 1882.

[No. 3.]

Fresh-Water Algae. VI.

By FRANCIS WOLLE.

(Plate XIII.)

Indexed
Apr. 1. 1882.
n. 4. 2.

The following is a partial list of fresh-water algae collected by myself and by interested contributors during the past summer (1881). The addition to the recognized forms of the algae of the United States is not so large as that made in some previous years; nevertheless it indicates that our waters have not yet been fully explored. More forms ought to be found; indeed, some genera are not as yet represented. Why do we find no *Sphaeroplea*? Good forms of *Prasiola* have not yet occurred, except from the Rocky Mountains; while less conspicuous forms, well known in Europe, are also wanting.

GOMPHOSPHERIA, Ktz.—*G. aponina*, Ktz., var. **CORDIFORMIS**, *n. var.* (Plate XIII, Fig. 11). *G. thallo primario laete aeruginoso, deinde pallide aurantiaco, vel expallescenti; tegumentis achromaticis, subcrassis; cellulis numerosis, densis; cellulis marginalibus distincte cordiformibus, paullo longioribus quam latioribus; cellulis in medio, a vertice visis, bicocciformibus; cytoplasmate granulato aerugineo vel expallescente. Diam. cellul. .0005"—.0006"; long. .0006"—.0008"; crass. .0003"—.0004.*

Hab. Small ponds near Bethlehem, Penn.

This plant differs from *G. aponina*, Ktz., in the form of the cellules, which are decidedly heart-shaped, not "cuneate." The coenobia and the cellules are fully twice the size of those of the only species described.

SPIRILLUM, Ehrb.—*S. undula*, Ehrb. **Hab.** Small ponds, Penn.

SPIRULINA, Link.—*S. Jenneri*, Hass. **Hab.** Ponds, Penn.

OSCILLARIA, Boss.—*O. littoralis*, Carm.; coll. by R. Hitchcock in submarine waters, New York. *O. crassissima*, Rab., in trenches, Penn. *O. deterosa*, Stitz.; coll. by Dr. A. Seipt in a pool in Luray Cave, Va., 260 ft. below the surface.

PHORMIDIUM, Ktz.—*P. inundatum*, Ktz., on moist earth, S. Car.; coll. by H. W. Ravenel. *P. tinctorium*, Ktz., coll. by C. G. Pringle, April, in springs, Arizona.

CALOTHRIX, Ag.—*C. gracilis*, Rab., on river stones in shallow water, Penn. *C. affinis*, Menegh., through R. Hitchcock, from Sandwich Islands.

DIMORPHOCOCCUS, A. Br.—*D. lunatus*, A. Br., New Jersey.

PALMODACTYLON, Naeg.—*P. simplex*, Naeg., coll. by R. Hitchcock, in Croton water, New York.

OOCYSTIS, Naeg.—*O. Naegeli*, A. Br., frequent in ponds, Penn. and New Jersey.

PEDIASTRUM, Meyen.—*P. simplex*, Meyen; typical form (Plate XIII, Figs. 1 and 1'; two new varieties, Figs. 1'' and 1'''.) *P. biradiatum*, Meyen; all collected by R. Hitchcock in the New York City supply of Croton water.

SORASTRUM, Ktz.—*S. echinatum*, Ktz., ponds, N. J. and Pa.

GONIUM, Müller.—*G. pectorale*, Mull., in ponds, N. J.

POLYEDRIUM, Naeg.—*P. minimum*, A. Br., in ponds, Penn.

SPIROGYRA, Link.—*Sp. orbicularis*, Hass., abundant in fruit in a small stream, Bethlehem, Pa. *Sp. bellis*, Hass., Budd's Lake, N. J. *Sp. condensata* coll. by H. H. Rusby near Silver City, New Mexico. *Sp. quadrata*, Hass., in river near Bethlehem, Pa. *Sp. setiforme*, Roth., not new except in the condition of the spores, which present the early stages of development. *Sp. fluvialis*, Hilse. European authors are united in declaring the fruiting of this species unknown. October 8th last I was fortunate in finding the plant in fine fruit in a pond near Bethlehem, Pa.

The diagnosis should be corrected to read, "*Sp. saturate viridis*, minus lubrica; articulis sterilibus cylindricis, diametro (.1014"—.00159) 2-6-plo longioribus; sporiferis valde tumidis; sporis aut ovalibus aut late ellipticis; diametro .0021"—.0023"; long. .003"—.0033"; fasciis spiralibus 4 sublati, anfractibus densissimis."

MESOCARPUS, Hass.—*M. depressus*, Hass., Mobile, Ala., coll. by M. S. McNeil. *M. recurvus*, Hass., St. Lawrence River, coll. by I. M. Adams.

STAUROSPERMUM, Ktz.—*S. quadratum*, Ktz., in small stream, S. Carolina, coll. by H. W. Ravenel.

RHIZOCLONIUM, Ktz.—Rh. HOSFORDII, n. sp.—Rh. laete saturate viride, vel luteolo-viride, crispatum, rigidum, filis ramulos breves unicellulares numerosos emittentibus; articulis diametro (0.016") 2-4-6 plo longioribus; cytodermate crasso hyalino homogeneo.

Collected near Aurora, N. Y., by F. H. Hosford. It is nearest *Rh. Casperi*, Harw., but is much firmer, nearly twice the size; and is purely a fresh-water plant.

ULOTHRIX, Ktz.—*U. Jurgensii*, Ktz., coll. by H. W. Ravenel in rice-field ditches near Darien, Ga.

CLOSTERIUM, Nitzsch.—*C. Ehrenbergii*, Menegh, var. IMMANE, n. var., differs from the typical form mainly in size. Measures .0083" diameter, nearly twice the diameter of the largest variety of this genus on record. Collected in Budd's Lake, N. J., Aug. 1, 1881.

COSMARIUM, Corda.—*C. anisochondrum*, Nord., in Denmark Pond, N. J. *C. bireme*, Nord., in ponds, Penn. and N. J. *C. Clepsydra*, Nord., Budd's Lake, N. J. *C. globosum*, Bulnh., in ponds, Penn. and N. J. *C. galeritum*, Nord., in ponds, N. J. *C. Holmiense*, Lund., on Mt. Mansfield, Vt., coll. by F. H. Hosford. *C. nitidulum*, De. Not., coll. by F. H. Hosford. *C. orthostichum*, Lund., in Denmark Pond, N. J. *C. punctatum*, Bréb., Penn., N. J. and Mass. *C. pseudogranatum*, Nord., N. J. *C. quadrifarium*, Lund., Mt. Marcy, Vt. *C. rupestre*, Naeg., Mt. Marcy, Vt. *C. taxichondrum*, Lund., Mt. Marcy, Vt. (The last three were collected by Rev. H. D. Kitchel. The last-named species I have since found not uncommon in New Jersey.) *C. monomazum*, Lund., near var. *polymazum*, Nord., (Plate XIII, Figs. 15 and 15'), but differs in having 6 papillae on each side of the semi-cells instead of 1 on one side and 4 on the other. Denmark Pond, N. J.

COSMARIUM KITCHELII, n. sp. (Plate XIII; Fig. 3, front view;

3', side view; 3", end view.) C. submediocre diametro quarta parte longius, profunde constrictum; sinu lineari angusto; semicellulis perfecte semicircularibus; angulis inferioribus subrectis, in margine verrucis circiter 18, et intra marginem seriebus 1 vel 2 concentricis verrucarum ornatis; in centro granulis plerumque 6 in series 2 transversas ordinatis; e vertice visis ovato-ellipticis, granulis in medio seriebus 4 ordinatis; utrinque ternis granulis ornatis; a latere visis circularibus, granulis utrinque 2 et in medio seriebus 4 ordinatis. Latitudo isthmi tertia pars diametri transversalis corporis; long. .00133" (=34 μ); lat. .0016" (=40 μ).

Hab. In a pond, Hammonton, N. J. Collected by Rev. H. D. Kitchel. This species is readily recognized by the end or side view; in the former, by the two large marginal granules, and in the latter by the four rows of smaller central granules.

BAMBUSINA, Ktze.—B. DELICATISSIMA, n. sp.—B. fasciis prae-longis, nodosis; cellulis cylindricis, diametro (.00023"—.0003") 4-5-plo longioribus, a medio duabus vittis transversis annuliformibus instructis; annulis plus elevatis quam latis. Trichomatibus, cum annulis, .0006"—.0007".

Hab. In a pond, Pleasant Mills, N. J.

I have deemed this plant worthy of separation from the usual form: it has only about one-third the diameter of the trichoma proper, the rings are much more elevated, and the length of the cells is usually fully four times the diameter.

EUASTRUM, Ehrh.—*E. inerme*, Lund., and *E. erosum*, Lund., both from ponds in Penn. and N. J. *E. divaricatum*, Lund., in pond, New Jersey.

GONATOZYGON, De By.—G. PILOSUM, n. sp. (Plate XIII, Fig. 16.) G. cellulis elongatis diametro 12-20-plo longioribus, laxè connexis, cytodermate plus minus dense spinuloso; spinis tenuibus, rectis, hirsutis; cellulis cylindricis utroque polo non constrictis, nisi cellulis terminatibus modice attenuatis, polo rotundato. Diam., sine spinis, .0006"—.0006"; cum spinis .001".

Separated from other forms mainly by the vesture of hairs. Frequent in ponds of New Jersey.

MICRASTERIAS, Ag.—*M. foliacea*, Bailey. Prof. Bailey discovered this plant in Rhode Island more than thirty years ago. After seven years of searching I have at last rediscovered it in Denmark Pond, New Jersey, where it occurs in abundance. Dr. Nordstedt found it in Brazil. Studying from the somewhat imperfect figure, he made a new var. *ornata*. There is no doubt that I have the original form, and that the Brazilian plant is the same. A peculiarity of this species is that it is rarely found singly. The polar lobe projects considerably, and is furnished with two surface teeth. As the plant multiplies by division, these projecting lobes lap over each other and cling together; they are usually found in series of 4-10.

In the same pond are also interesting varieties of *Micrasterias truncata*, Corda., one only .002" in length and breadth. *M. muricata*, Bailey, occurred frequently last summer, as did also *M. laticeps*, Nord., which is the same as Wood's *disputata* of later date.

STAURASTRUM, Meyen.—*St. muricatum*. Bréb. *St. pecten*,

Perty. *St. Brasiliense*, Nord., (first discovery of this plant north of the Gulf States). *St. rotula*, Nord., (Plate XIII, Fig. 9.) *St. Ophiura*, Lund., in two new varieties, described by the names TETRACERUM, (four-armed) (Plate XIII, Fig. 4.) and PENTACERUM, (five-armed) (Plate, XIII, Fig. 5.) All of these were collected in Denmark Pond, New Jersey. *St. furcatum*, Ehrb., in Croton water, New York, coll. by R. Hitchcock. *St. Pseudosebaldi*, Nord., in Budd's Lake, N. J.

STAURASTRUM DIVARICATUM, *n. sp.* (Plate XIII, Fig. 12.) *St. parvum*, paullo longius quam latius, granulato-asperum; sinu lineari angustissimo; semicellulis subquadratis, angulis superioribus in cornu elongatum divaricatum, apice bifido, productis; a vertice visum forma pentagonali, quinque-radiatum. Diam., sine cornibus, .0015".

Hab. In a pond, Hammonton, N. J. Coll. by Rev. H. D. Kitchel.

This species approaches my *St. pusillum*, but is somewhat larger and has not 4 but 5 arms, which are not obtuse but bifid.

STAURASTRUM CORONATUM, *n. sp.* (Plate XIII, Fig. 16.) *St. submagnum*, dupla parte circa latius quam longius; sinu angusto-lineari; semicellulis fere obovatis, lateribus in cornu incurvum productis, sursum sensim dilatatis, in apice convexo processibus dentiformibus in coronam ordinatis; semicellulis a vertice visis 6-radiatis, in medio coronula papillarum ornatis; radiis apice subtiliter trifidis, marginibus delicate serrato-dentatis. Long. .0018"; lat. .0033"; isth. .001".

Hab. Denmark Pond, New Jersey.

This plant has the crown-teeth of *St. rotula*, Nord., but not the size, number of arms, nor the serration.

STAURASTRUM DISTENTUM, *n. sp.* (Plate XIII, Figs. 7 and 7'.) *St. mediocres*, leve; semicellulis fere obovatis, sursum sensim dilatatis, apice convexo-crenulatis; angulis superioribus in radium elongatum gracilem substrictum productis; margine non denticulato, apice profunde trifido distento. Semicellulis a vertice visis 5-vel rarius 6-radiatis, apice radiorum tridentato, dilatato, inter bases hastatas sinu profunde lineari. Diam. et long., cum rad., .0016".

Hab. Ponds, Sussex Co., N. J.

The sinus between the hastate bases of the radii, reminds one of my *St. pulchrum* (TORREY BULL., April, 1880,) but the sinuses are linear, not circular, and the ends of the radii are not obtuse but trifid, with the three teeth unusually large and spreading.

STAURASTRUM FUSIFORME, *n. sp.* (Plate XIII, Fig. 8.) *St. submagnum*, semicellulis angusto-fusiformibus, angulis lateris in processus longissimos achroos margine crenato-dentato apice bifurcato productis; dorsum subacutangulare, crenatum; semicellulis a vertice fusiformibus, lateribus in radios rectos, gracillimos attenuatis, apice bifido. Diam., cum rad., .005"—.0055"; long. .0015".

This species appears to be related to *St. leptocladum*, Nord., and *St. grallatorium*, Nord., but differs from both in form of cell; from the former in the length of body, and from the other in the absence of the produced back and the aculei.

STAURASTRUM KITCHELII, *n. sp.* (Plate XIII, Figs. 2 and 2'.) *St. parvum*, circiter tam longum quam latum, leve; semicellulis ellipticis divergentibus, introrsum ventricosis, dorso plus minus inflato, angulis in processus bifurcos productis, a vertice triangulari-

bus, medio processibus similibus tribus radiatis ordinatis. Diam. .0015"—.200".

Coll. by Rev. H. D. Kitchel in Gilder Pond, Mt. Marcy, Vt.

Ralf's *St. spinosum* bears a similarity, but is separated by having two or more spines on each side beside the one terminating each angle. *St. furcatum*, Ehrb., is also akin, but has more spines. These forms are moreover, granularly roughened, not smooth. The spines are not properly "lateral" but central, the ends projecting over the sides.

Staurostrum proboscidium, Bréb., var. AMERICANUM, *n. var.* (Plate XIII, Fig. 10.) This plant was collected in Crystal Bay, St. Lawrence River, Canada, by J. M. Adams. It bears some similarity to a variety of *St. asperum*, described by Brébisson, and also to a form, *Javanica*, described by Nordstedt; but it differs in the arrangement of the granules and in the shape of the rays (proboscidi), which are longer and more cylindrical.

STAURASTRUM TRIDENTIFERUM, *n. sp.* (Plate XIII, Fig. 13.) *St. exiguum* leve, sinu amplissimo; semicellulis ellipticis, dorso convexo, vel subplano, angulis in aculeos tres rectos divaricatos productis, a vertice visis triangularibus, lateribus modice retusis, tribus aculeis in angulos impositis. Diam. sine aculeis .0008"; cum ac., .001". Hab. in a pond near Bethlehem, Pa.

This plant is nearest a form of *St. dejectum*, but is separated by the three spines at the angles.

XANTHIDIUM, Ehrb.—XANTHIDIUM TETRACENTROTUM, *n. sp.* (Plate XIII, Figs. 14 and 14', front and end view. *X. parvum*, circiter tam latum quam longum, leve, constrictione acute cuneata (non lineari); semicellulis subreniformibus vel subhexagonalibus, basi subplana, dorso late rotundo-truncato, uno angulo mediano utrinque in aculeos geminatos breves acutos producto; tuberculo centrali minus elevato; cytiodermate levi vel serie singula parvularum granularum praedito. Diam., sine sp. .0013"—.0015"; cum sp., .0024"—.0025"; long. .0015"—.0016".

Hab. Ponds, Sussex Co., New Jersey.

The shape of the semicells is very near that of *X. fasciculatum*, but they are much smaller and bear only two pairs of aculei, not four or six.

BATRACHOSPERMUM, Roth.—*B. vagum*, Roth., var. RAVENELII, *n. var.* *B. bi-tri-polices* longum, crassum flavo-aerugineum, sine corticulo, vel rarius ramulis accessoriiis; articulis diametro (ad .006".) plerumque aequalibus vel paulo plus minus, achrois; ramis primariis parvis; ramulis verticilli plerumque brevibus; verticillis confertissimis, nonnumquam nullis, sed saepius quoque geniculo cum 2-3 fasciculis brevissimis instructo.

Collected by H. W. Ravenel, at St. John's, Berkley, S. C.

This is a distinct form, particularly in the absence of the accessory filaments which constitute the corticular covering or rind of the primary filaments. Bory is credited with a variety of like character, but of dark purple color, verticils far apart and branchlets long; mine on the contrary is of yellowish green or light aeruginous color, verticils very close and branchlets very short. The articulations or

cells of the stems are short, colorless, often much contracted at the joints ; this feature causes some parts of the filaments to have a striking resemblance to forms of *Draparnaldia*.

The Fruits of Cucurbita.

BY C. C. PARRY.

(Plate XIV.)

It naturally happens that the fruits, even of common plants, especially those of a fleshy or bulky character, are poorly represented in herbaria. In consequence of this fact, the descriptions in systematic works are often defective in this important particular. I propose, as a small contribution towards supplying such defects, to present some outline sketches, and diagnostic characters of three species of *Cucurbita* that have lately come under my notice.

In all the generic descriptions of *Cucurbita* the fruit is represented as three-celled, *i. e.*, with three placentas.

It is now over thirty years since my attention was cursorily called to the fact that a species of *Cucurbita*, not uncommon in the vicinity of San Diego, California, was quite constantly 5-celled. From want of sufficient material this species remained unnoticed, till lately described by Mr. Watson as *Cucurbita palmata*, but without his noticing its 5-celled fruit.

Another still older species, of Arizona, *Cucurbita digitata*, Gray, is also found to possess the same character, having 5 placentas. It is perhaps something more than a coincidence, that both these species, as well as the doubtful *Cucurbita Californica*, Watson, have five-lobed leaves, as distinguished from *Cucurbita perennis*, Gray, in which the leaves are triangular, and the fruit normally 3-celled. The accompanying sketches (all natural size) will help to exhibit these characters, and also show the usual variation in size of fruit and seed.

Referring to each in regular order we note the following diagnostic characters :

Cucurbita perennis, Gray.—Fruit orbicular, medium size, 2-2½ inches in diameter, normally 3-celled (occasionally, in large specimens, 4-celled); outside marking lemon-yellow on a greenish ground, longitudinal lines irregular, *i. e.*, not corresponding to internal divisions ; placentas thin, separating at maturity ; seed unevenly curved, its length 4-5 lines, about twice its breadth, with raised margins.

Cucurbita digitata, Gray.—Fruit rather flattened, orbicular, 2-3 inches in diameter, normally 5-celled, (rarely 6); outside marking brownish yellow, the longitudinal lines very distinct, corresponding closely to the 10 internal divisions, the lines corresponding to the thickened placentas being the broadest ; seeds evenly ovate, light brown, 4-5 lines long, less than one-half the breadth, thick, without raised margins.

Cucurbita palmata, Watson.—Fruit orbicular, 3-5 inches in diameter, 5-celled (rarely 6); outside markings more blotched, green and light yellow, longitudinal markings moderately prominent and usually

corresponding to internal divisions; placentas thickened; seeds plump, whitish, broad-ovate, somewhat irregular, 5-6 inches long.

DESCRIPTION OF PLATE XIV.—Fig. 1., *Cucurbita perennis*, Gray. *a*, cross-section of mature fruit; *b*, a seed. Fig. 2., *C. digitata*, Gray. *a*, cross-section of mature fruit; *b*, a seed. Fig. 3., base of fruit of *C. digitata*, showing 10 longitudinal markings. Fig. 4., *C. palmata*, Watson, *a*, cross-section of fruit; *b*, a seed.

New Californian Plants.

By MARCUS E. JONES.

TRIFOLIUM MULTICAULE.—Stems many from the summit of a thick, upright, perennial root, diffusely spreading, very slender, 6'-12' long; leaflets three, 3"-4" long, 1"-1½" wide; lowest obovate, cuneate, notched; upper ones oblanceolate, obtuse, (central one cuneate), finely serrate; stipules ovate, toothed; peduncles axillary, 1' long, twice as long as the leaves; involucre ½"-1" long, 3-5-cleft, divisions entire or 2-cleft; flowers 5" long, narrow, not inflated, not recurved, very shortly pediceled; calyx sparsely hairy, 10-nerved, teeth subulate or long-triangular, one-nerved, scarcely aristate, edge smooth; corolla yellowish-white with a purple keel; pod 2-seeded; lower petioles short; pubescence villous, spreading.

Soda Springs, near Summit, Cal., July, 1882.

This is apparently very distinct from any other *Trifolium*, and is one of the prettiest species.

Mr. Watson informs me that this plant is *T. monanthum*, the pubescent form. It is, however, a mistake I think, to refer a thick-rooted perennial to a slender annual. It is undoubtedly distinct, even if *T. monanthum* is a perennial (contrary to all our previous knowledge of it) for the true *T. monanthum*, if other specimens so referred by Mr. Watson are correct (and there is no doubt of his accuracy in the matter) is a very delicate, prostrate, glabrous plant, with slender, creeping, perennial rootstocks, while *T. multicaule* has a thick, vertical root, which produces many ascending stems; the plant is softly hairy, and the flowers have a more conspicuous involucre and are more numerous.

GRINDELIA PACIFICA.—Stems clustered, 6' high, erect or ascending, branching toward the top; root-leaves filiform, 2'-4' long, varying to very narrowly oblanceolate with a long filiform petiole, entire or with a tooth or two at the summit; upper stem-leaves oblanceolate; short, sessile, with a broad, cordate, clasping base, entire or sparsely toothed; uppermost leaves passing into the involucre scales, which are lax and with filiform herbaceous tips 3"-12" long; involucre not over 6" broad; rays yellow, 3" long; heads terminal.

On the hills at Santa Cruz, Cal.

Very peculiar in the filiform root-leaves.

Spraguea umbellata, Torr., var. MONTANA.—Petals white, stamens yellow; scarious bracts 2"-4" long, very broad, equalling the sepals and very conspicuous.

Soda Springs, near Summit, Cal., July, 1882.

This plant appears to be very distinct, but, after a careful comparison of several hundred specimens in various stages of development, I find it shows a transition or similarity in other respects, though

not in the characters given above. The bracts of *S. umbellata* are from 1" to 1½" long, usually ½ smaller than the sepals, the upper scales on the stem are slightly hyaline at base; seed black, shining and *tuberculate* in pretty evident circular lines, not striate as figured by Torrey. The bracts of var. *montana* are scarcely ever shorter than the sepals, but often longer; upper scales on the stem hyaline all over, the hyaline part on each side being twice the width of the green centre. The heads of *S. umbellata* are usually divided into many small, dense, round glomerules: in the var. they are all compacted into one large dense head, the peduncles seldom being longer than the bracts. The bracts of *S. umbellata* are obovate; those of the var. are ovate-oblong or (usually) orbicular. The var. grows at a higher altitude than the typical form, generally close to snow.

OXYTHECA REDDINGIANA.—Bracts united only at the base, linear, hirsute, awnless, gradually reduced; leaves very narrowly linear-oblanccolate, 1" long, less than 1" wide, hirsute; involucre 4-cleft below the middle, the short, ovate hyaline margined lobes barely acute, ½" long, awnless; pedicel glabrous, reddish, capillary, from 2 to 10 times the length of the involucre: flowers 1" long, deep rose-colored, the centre of the segments almost black and the edges white or yellow, segments ovate, rounded, somewhat narrowed at base, sparsely hairy along the centre. The main stem and all its branches are pubescent with stalked glands. Resembles *Gilia pusilla*, and is scarcely less delicate.

Near the snow-sheds at Soda Springs, near Summit, Cal., July, 1882. Dedicated to Mr. B. B. Redding, to whom we are indebted for much of our knowledge of Californian botany. Though his interest has been greater and his aid more substantial than that of almost any other man, his services have never yet been recognized. I therefore take this opportunity to dedicate to him this pretty little annual.

Mr. Watson says that this plant is *Eriogonum spergulinum*, but it is in my judgment a far better *Oxytheca*, and is wrongly referred to *Eriogonum*. Its nearest relatives are *O. inermis* and *O. dendroidea*. It tends to invalidate the genus *Oxytheca*, as does also *O. inermis* by the absence of awns. It is, however, in all other respects a good *Oxytheca*.

Salt Lake City, Utah.

Change of Name in a Grass.—In recent studies on *Hilaria* and *Pleuraphis* I came to regard them as very closely allied genera, and, in fact, saw no reason why they should not be united. The characters of the spikelets also pointed rather to Paniceae (being articulated with the pedicel below the glumes, etc.) than to the tribes into which they had been assigned by authors—*Hilaria* in Phalarideae and *Pleuraphis* in Pappophoreae.

I communicated these views to my friend Dr. Vasey, Botanist of the Department of Agriculture, at Washington, and he states in reply: "As to *Pleuraphis*, you are correct as to its relationship with *Hilaria*. Mr. Bentham, in his recent paper on Gramineae, reduces *Pleuraphis* to *Hilaria*, so we must now write *Hilaria Jamesii*, Benth.,

etc. So, likewise, you are correct in placing *Hilaria* in Paniceae—tribe Zoysieae, according to Bentham."

There are three described species of *Pleuraphis* from the Southwest:

1. *P. Jamesii*, Torr., in Ann. Lyc., N. Y., i, 1824; p. 148 t. 10. M. E. Jones has distributed this in his Colorado collections.

2. *P. mutica*, Buckley in Proc. Acad., Phil., 1862, p. 95. There are specimens of this in the Herb. Acad. Phila., and I have specimens collected by Frank Tweedy in Tom Green County, Texas, 1880. Nos. 760 and 2108 of C. Wright are the same (Gray in Proc. Acad. Phil., 1862, p. 335.)

3. *P. rigida*, Thurber, Gram. Mex. Bound, ined., published in Bot. Cal. ii, p. 293. It is No. 494 of E. Palmer's collection, 1877.

These three species are now placed in the genus *Hilaria*, and if due credit is to be given their authors they should be written *Hilaria Jamesii*, (Torr.) Benth., *H. mutica*, (Buckley) Benth., and *H. rigida* (Thurb.) Benth.

Hilaria cenchroides, H.B.K. The single species heretofore included in this genus was distributed with E. Hall's Texan plants, No. 846, and it is in Pringle's sets of Pacific Slope Plants, collected in Arizona, near Camp Lowell, July, 1881.

F. LAMSON SCRIBNER.

Theory of Lichens.—Dr. J. Müller of Geneva, Switzerland, has recently pointed out an interesting confirmation of Dr. Minks's theory of lichens in a Brazilian *Coenogonium*. In this genus, one or more species of which occurs in the Southern States, the gonidial system is composed of a series of green cells contained in a longitudinal central tube, and surrounded by slender colorless filaments; the former corresponding, in the Schwendener theory, to the algoid element, and the latter to the fungoid. In the new species, *C. pannosum*, Müll., Arg. in *Flora*, 1881, p. 234, a filament of the latter kind was found in a portion of its length to contain gonidia resembling those of the algoid tube, but at a certain point it suddenly contracted to the form of a cone a little longer than broad, and continued as a slender capillary tube, in which the internal cavity was continuous with that of the larger portion; and in this portion of it were clearly perceived the microgonidia in their natural form, size and arrangement.

It follows from this, says Dr. Müller, that one and the same cell, at one end enlarged and bearing gonidia, would be the theoretic alga, and at the other contracted and containing microgonidia would be the theoretic fungus, proving absolutely the falsehood of the theory, all is lichen, and only lichen, and both sorts of tubes, so different at first sight, are only different states of evolution of one and the same organ.

New Bedford, Mass.

H. W.

New Station for Arceuthobium.—Central New York has, in days gone by, been the home of many prominent botanists, and a new discovery in this section is of rare occurrence. I have the

pleasure of announcing a discovery of my own. On May 28th and June 25th, 1881, I detected *Arceuthobium pusillum*, Peck, growing very abundantly on *Abies nigra* in the Graefenberg swamps on the heights of Frankfort, Herkimer County, N. Y., about six miles S. E. of Utica. My surprise was great, inasmuch as the same region had been most thoroughly explored years ago, as shown by the record in Paine's Catalogue. Prof. Asa Gray, Drs. Vasey and Knieskern, John A. Paine, Jr., Edwin Hunt and others were all probably well acquainted with the locality, and it is truly remarkable that the plant should have been overlooked by them, since its great abundance now, indicates that it has had its home there for years. Suspicion alone on my part led to its discovery. I had received specimens from Oswego County from my friend Rev. J. H. Wibbe, and, when his locality was made known to me, I suspected that the plant might grow nearer home. In 1879 I looked for it in N. Herkimer and Hamilton Counties but failed to find it; but last year I made a special effort and succeeded. It was an easy discovery, however, as almost the first spruce that I examined was literally covered with it. The pistillate plants were the most abundant, and some of them measured nearly an inch in length. The plants were not confined to stunted trees, but were found sparingly on the lower branches of healthy ones. I noticed that all growths of from five to fifteen feet high were favored, especially where the tops had been broken off; and new shoots in a circle at the tops were completely covered. I thought at the time that *Abies alba* and *A. balsamea* might be affected in the same way, but was prevented by ill health from making the investigation, and was unable for the same reason to discover any other station. As, in this immediate vicinity, there are other localities almost identical, I think that another season will show the plant to be more widely distributed, and to grow in Oneida County as well.

Utica, N. Y.

JOSEPH V. HABERER.

Note on Oregon Grasses.—The two grasses here named were collected by Mr. C. G. Pringle at Roseburg, Oregon, Oct. 2d, 1881.

Gastridium australe, P. B. (Thurber in Bot. Cal. ii, page 275).—Dr. Thurber states, upon the authority of Mr. Bolander, that this grass is common in California on the coast, and "late in the season covers the dry hills everywhere." I am not aware of any record having been made of its occurrence in Oregon.

Aristida oligantha, Mx. (Gray., Man. 5th ed., p. 618).—The awns are a little shorter than in specimens from the Eastern States, and both the glumes and florets are deeply colored with purple. This grass has not before been reported west of Colorado.

F. LAMSON SCRIBNER.

Design of some Leaf-forms.—Most aquatic plants are so formed that they offer but little resistance to moving waters. Many species of *Potamogeton*, *Isoetes*, *Chara*, *Nitella*, and algae have filiform leaves or stems (or both), which offer but little resistance to changing currents of water. *Ranunculus aquatilis* and *Potamogeton* (a dozen

species) have filiform leaves below the surface of the water, and spreading leaves above. The floating heart, frog's-bit, duck-weed, pond-lily, *Marsilia*, etc., with their hanging roots, or slender stems, present no opposing surface to water. *Polygonum aquaticum*, with its float-like leaves at the ends of long and slender petioles, is not likely to be torn from its place of growth, however swift the current.

The form and arrangement of the leaves of conifers and heaths are well adapted to wind-swept regions. The conifers grow in the highest Alpine regions the world over, where they are subjected to the most violent winds and storms; but their leaves, being so very small and unusually well secured to the branches, offer but little resistance to the winds. The winds that set the oaks, elms and maples in an uproar pass over the pine, larch, and spruce with a whisper. On the wind-swept moors and downs of England the fine-leaved heaths grow in the greatest profusion.

Possibly it might be worth while for some botanists to consider why each family or species of plants has leaves of a shape peculiar to itself, and why some other form would not do as well, keeping in view the plant's place of growth and the work it has to do. The function of leaves as depositories of food and moisture, and that of bulb-scales, bud-scales, spines, tendrils, pitchers, fly-traps, etc., has been well explained, but are there not some other interesting generalizations that are known to some botanists and which have not been made known to botanists at large?

The thick and glossy leaves of the Ericaceae, the much-divided leaves of the Umbelliferae, the thick and succulent leaves of many salt-marsh plants, and other well-known facts, suggest questions which are not easily answered in a satisfactory manner by one man; but, by the mouths of many witnesses, the design of some leaf-forms may be established.

Do the rings of beets show growth during any definite period of time?

Roxbury, Mass.

H. L. CLAPP.

Gleanings in Westchester County.—In October, 1880, I stumbled upon a small cluster of *Aster amethystinus*, Nutt., about half a mile North of Wood-Lawn Cemetery, on a new road leading to Mount Vernon. Several species of *Aster* were growing near by, but I failed to find this one in any other place, though I searched for it through fields and along road-sides for a mile or more around.

In July, 1881, I found *Scirpus sylvaticus*, L., and *Melanthium Virginicum*, L., in a small bog about a mile East of Tarrytown. In neglected yards and gardens within the village proper, *Galinsoga parviflora*, Cav., has appeared in profusion, but as a recent interloper.

Yonkers, N. Y.

E. C. HOWE,

A Query.—Can any reader of the BULLETIN forward proof that *Carex Knieskernii*, Dew., is a good species? Dr. Gray, in comparing it with *C. Sullivantii*, says: "Perigynia glabrous and more evidently nerved." Dewey (in Wood) refers to an "oblong achenium." Now, *C. Sullivantii* has an oblong achenium, but it is always abortive. Dr.

Geo. Vasey regards this so-called species as a form of *C. sylvatica*, Huds., (of Europe); but the latter is more than thrice as small, and the perigynia are long-beaked. Mr. William Boott writes me that *C. Sullivantii* and *C. Knieskernii* are one and the same. Is it possible to get any further light on this subject?

Yonkers, N. Y.

E. C. HOWE.

The Syracuse Botanical Club.—Since commencing our expeditions this season we have made many new additions to our collection of the Onondaga flora, among them being *Magnolia glauca*, L.; *Stellaria longifolia*, Muhl.; *Geranium maculatum*, L., with pure white flowers; *Rhamnus catharticus*, L.; all of the maples given in Gray's Manual; *Gymnocladus Canadensis*, Lam.; *Potentilla palustris*, Scop.; *Pyrus sambucifolia*, Cham. & Schlecht.; *Amelanchier Canadensis*, var. *Botryopium*, T. & G., a tree fully fifty feet high; *Chrysosplenium Americanum*, Schwein.; *Oenothera pumila*, L.; *Lonicera oblongifolia*, Muhl., with pure white flowers; *Viburnum nudum*, L.; *Hieracium aurantiacum*, L., although an introduced plant, becoming very common, even springing up in the flower-beds in our gardens, and another introduced composite, *Tragopogon pratensis*, L., bidding fair to be as common along roadsides and in fields; *Specularia perfoliata*, A. DC.; *Kalmia glauca*, Ait., for the first time in flower; *Ilex monticola*, Gray; *Plantago lanceolata*, L., with hypertrophied compound spikes; *Menyanthes trifoliata*, L.; *Myrica Gale*, L.; *Betula pumila*, L.; many willows of whose species we are not as sure as we hope to be; *Zannichellia palustris*, L.; *Potamogeton crispus*, L., in fruit in Seneca River; *Scheuchzeria palustris*, L., in flower; *Habenaria virescens*, Spreng., sweet-scented, with the odor of clover; *Smilacina trifolia*, Desf.; *Ornithogalum umbellatum*, L., in bloom in the midst of Cicero Swamp; *Eriophorum vaginatum*, L., and *E. gracile*, Koch., vars. *pau-cinervium* and *brevifolium*; *Carex siccata*, Dew.; *C. Muhlenbergii*, Schk.; *C. stricta*, Lam.; *C. crinita*, var. *morbida*, Carey; *C. limosa*, L.; *C. irrigua*, Smith; *C. grisea*, Wahl.; *C. debilis*, Michx.; *C. riparia*, Curtis; *C. Pseudo-Cyperus*, L., and *C. lupuliformis*, Sartwell. We have just begun collecting Gramineae and Equisetaceae. One of our members, Mrs. Leach, has at last discovered two stations for *Ophioglossum vulgatum*, which had been found before in Onondaga County, but not by any of the Syracuse Botanical Club. Most of our old floral friends we have found ready to greet us whenever we have visited their homes.

MARY OLIVIA RUST.

CORRECTION.—In Mr. Greene's article in our February number, the word "leaves" (p. 16, 9th line from bottom) should read "rays."

In Mr. Ravenel's note on page 23, "just in leaf" (line 17) should read "not in leaf," and "eight feet" (line 20) should read "three feet."

BULLETIN
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Development of the Cortex in *Chara*.

Illustrated by a Series of American Species.

By T. F. ALLEN.

(Plates xv-xxii.)

A classification of the species of *Chara* based upon a correct and thorough knowledge of their morphological characteristics was first attempted by the late Prof. A. Braun, who so arranged the genera and species of the whole order Characeae, that we are able to trace a gradual development from the simplest dioecious *Nitella*, with unicellular stems and leaves, to the most completely developed *Chara* (*C. fragilis*, Desv.). The formation of "nodes" and a complete development of the node-bract and fruit-bearing leaf may be already seen in the simplest *Chara*; but the genus is still further elevated by the growth of a cortical series of cells, which may be traced from the rudimentary cells of the leaf-node to a perfect evolution.

The development of "stipules" (traces of which begin to appear in the most highly organized *Nitella*) has been used by Prof. Braun to mark the three general divisions of the genus *Chara*, and the character of the cortication serves to mark sub-divisions. Both stipular and cortical cells spring from the nodal cells, and a consideration of their character must be preceded by an inquiry into the nature of a node.

The stem of a characeous plant grows through the formation of cells, by a process of sub-division of the apical growing cell. In Plate xv, Fig. 1a, *a* represents the growing apical cell; *n*, a cell which has itself sub-divided and is destined to be the node; and *i*, an inter-nodal cell which does not sub-divide, but which is destined to elongate indefinitely. The next figure (Fig. 1b) illustrates a developed stem, in which the inter-nodal cells *i*, *i* have extended, while the nodal cell *n* has sub-divided, but has not elongated.

From these nodal cells develop, in various ways, all organs—leaf, bract and new shoots; antheridia and sporangia; stipules and cortex.

Since, in this paper, we have to deal with the development of the cortex of the stem only, we may consider first a node of the stem with a basilar node of a leaf.

"A primary nodal-cell of the stem divides, soon after its origin, into two secondary cells by means of a vertical septum through its diameter; in each of these half-cells a semi-circle of peripheral cells forms by a farther eccentric, vertical fission in such manner that a new fission occurs alternately on one or the other side of the semi-circle. Both semi-circles begin on the same side of the node, progress toward each other, and, when at last they close together, form a complete circle of cells enclosing the two central cells, which, as remnants of the original halving-cell, form the nodal cells in the

strictest sense. The peripheral cells are the mother-cells of just so many leaves. The number of these cells, and of leaves in a verticil, amounts in most *Nitellae* regularly to six (very seldom five) and in *Chara* mostly to eight or ten, or even to fourteen or more. The leaves of successive verticils alternate with each other; for the halving-septum of each succeeding node forms an angle with that of the preceding, equal to a half interval of a verticil, so the position of the first leaf of each successive vertical deviates a half interval from that of the first leaf of the preceding verticil. In this way a definite precession is established; the first leaves of the verticils forming a spiral with small divergence ($\frac{1}{12}$, $\frac{1}{14}$, $\frac{1}{16}$, etc.). This spiral is always to the left (downward, T. F. A.); and in this direction, with the increasing tension of the internodes, a more or less noticeable torsion of the stem takes place, most distinctly seen in corticated species; in the naked species marked by the oblique course of the chlorophyll granules and indifferenced striae (indifferenz-streifen) as well as by the direction of the circulation." (A. Braun.)

Fig. 1c, of the same plate, represents a stem-node of *Chara coronata*, as seen from above, without the leaves. Each of the peripheral cells develops a leaf, as follows: the cell divides into two unequal portions by a horizontal septum, the lower and smaller segment remains in the node, while the upper divides into a "globular complexity" of cells, protrudes from the node and forms the basilar node of the leaf. This node consists of central and peripheral cells. The peripheral cells divide parallel to the surface of the node-disk, giving rise to superposed marginal cells; the lower marginal cells give rise to the cortex-cells of the stem; and the upper develop usually somewhat on either side of the lower and give origin to the stipules. Usually there are two stipules at the base of each leaf, one on either side, but in *Ch. ceratophylla* there is a third stipule developed from a cell arising between the other two. In *Ch. coronata* one of the lateral stipular cells fails to develop and but one stipule is seen, so that the stipules seem to alternate with the leaves. In *Lychnothamnus Wallrothii* the stipular cell remains directly in the centre, and the stipule is exactly opposite the leaf, no cortex being developed. *Chara stelligera*, possessing neither stipules nor cortex, exhibits at the base of the leaf three insignificant cells, protruding slightly. In *Nitella* and *Tolypella* we find no trace of cortical or stipular cells, though now and then accessory, simple, leaf-like formations remind one of stipules. In *N. hyalina* these are numerous, arising from the base of the leaves in pairs, externally or even internally.

The cortex-cells, arising from the basilar node of the leaf, behave in a manner quite similar to the primary cells of the stem. They consist of alternate, elongated and nodal cells; the former elongating as the stem elongates, the latter not elongating, but forming a node which develops a wart or spine and lateral cells.

1.—Some species of *Chara* never develop these cortex-tubes, and the stems remain naked, like those of *Chara coronata*, Ziz.

2.—Some species develop a simple cortex-tube, which is so small that it does not join the one from the next leaf, as *Chara inconnexa*, Allen.

3.—Some cortex-nodes develop spines but no secondary tubes; the primary tubes join and completely encircle the stem; *c. g.*, *Ch. crinita*.

4.—Some cortex-tubes show a partial development of secondary tubes, as in *Chara evoluta*, Allen.

5.—Some cortex-tubes develop *one* secondary cell only, which becomes as long as the primary cell, but smaller in size, as in *Chara excelsa*, Allen (also *Chara intermedia*, A. Br., *Ch. contraria*, A. Br.). (Section Tylacanthae.)

6.—Some develop only one lateral cortex-cell, which becomes larger than the primary cell and partially covers it, so that the primary cell seems to lie in a valley (Section Aulacanthae); for example, *Ch. foetida*, A. Br.

7.—Some cortex-cells develop perfectly one lateral cell and imperfectly another, as, for example, *Ch. aspera*.

8.—Some cortex-cells develop perfectly both lateral cells, so that three complete series of cells arise from each leaf, as in *Ch. fragilis* (also in *Ch. gymnopus*, A. Br.).

In Plate xv the figures correspond to the divisions given above. In *Chara aspera* the greatest variability may be observed (Fig. 7 from true *aspera*, Canada, and 7a from var. *Macounii*). In Fig. 7 the secondary cells meet obliquely, while in 7a one of the secondary cells extends past the other, so that a section of the stem at this point would show more than double the number of cortical tubes as compared with the leaves of the verticil. Fig. 7b was taken from a form of *Ch. aspera*(?) from Fort Pond, Long Island; unlike those of the typical *Ch. aspera*, the secondary cells join with square and not oblique ends, and these cells never or rarely overlap, as in true *aspera*; but the irregularity of the cortex is produced by the partial and irregular development of secondary cells from the opposite side of the node of the primary cell.

I have been unable to find subterranean bulblets on this plant, and a thorough examination may show affinities rather with *Ch. Krausii* (whose secondary cortex-cells join rectangularly) than with *Ch. aspera*. In Fig. 8 is represented a typical triplostichous cortex in which cells develop from both sides of the node to the primary cell and extend upward and downward to join cells from neighboring nodes. In Fig. 8a is represented an anomaly, sometimes noticed, in which, by reason of an unusual extension of some cells, the cortex becomes hyper-triplostichous. In Fig. 8a, *x, x* represent the primary tubes; *d*, a normal secondary tube which meets *d'* below and extends above to *c*, the latter overlapping and extending down to meet *a*, which in turn has overlapped *b* and extended up to meet *c*. At *b—d* there are *three* series of tubes between the primary series. Both *Chara fragilis* and *Ch. gymnopus* are, as a rule, regularly triplostichous; the former as regards the stem only, the latter both in stem and leaf.

Chara coronata, Ziz.—A description of the various forms of this species has been given recently in the *American Naturalist*, and it is unnecessary to reproduce it here. The cortex-cells of the basilar node of the leaf are rudimentary and the stems are entirely devoid of any cortex development. Plate xvi, illustrating one of the American varieties of this species, has been used in the *American Naturalist*.

CHARA INCONNEXA, n. sp.—Humilis, 3–4 cm. in alt. Caulis inermis, inferne ecorticatus, superne imperfecte corticatus cellularum seriebus cum numero foliorum congruentibus disjunctis. Folia verticilli 7–8, uno vel duobus ex articulis, foliola et fructificationem gerentibus, partim ecorticatis, partim haplostiche disjunctis corticatis, partim diplostiche corticatis; segmentis ultimis elongatis, 1–2-articulatis, cellula terminali mucronem formante; corona stipularis e duplici cellularum serie, minima, inconspicua. Foliola plerumque unilateralia, posteriora saepe evoluta, anteriora sporangio breviora, non inflata. Sporangium 8–10-striatum, 1 mm. long., coronula brevi truncata; nucleo 600 μ longo.

This exceedingly interesting plant was collected in Iowa by Prof. C. E. Bessey. The lower portion of the stem is quite naked, and translucent like *Nitella*; the lower verticils consist of long *Nitella*-like leaves which bear no nodes or bracts and have generally two articulations, the terminal segment forming a short mucronate tip. These leaves seem to me to have no stipules, though I have not been able to examine fresh specimens. The lowest fertile leaves are always entirely naked, and in these verticils are found a few rudimentary leaves without nodes or bracts. In the upper part of the stem the internodes of the latter become corticated in the primitive manner described and illustrated in the figure. The character of the cortication seems to be quite like that of *Ch. imperfecta*, A. Br. *Ch. dissoluta* A. Br., differs in a partial development of the lateral cells of the node of the cortex, so that the space between the primary cells of the cortex is filled at *intervals*, though spaces are left between the nodes. *Ch. imperfecta* is, however, dioecious, and has quite long bracts. *Ch. dissoluta*, to which this plant seems most nearly allied, differs in the more numerous nodes of the leaves, the larger and more striated nucleus, etc.

The upper leaves of this plant vary greatly in the same verticils; two nodes are commonly found with bracts and fruit, the lowest internode having a perfect double cortex, the upper an imperfect, disconnected cortex, like the stem, the leaf above being entirely ecorticated and quite long. Some leaves have two fertile nodes, with only the lowest internode corticated in the disconnected, imperfect manner characteristic of this plant; while other leaves (generally but one or two in a verticil) one entirely barren of fruit, bract, or node, and have one or two simple articulations merely. Frequently, in the upper part of the stem, the posterior bracts are quite plainly developed, but much smaller than the anterior.

The plant is small and very dark green; the stems are clothed with the long straight leaves and are rigid with incrustation.

Chara crinita, Wallr. (Ann. Bot., 1815); *Ch. horridula*, Detharding, in herb., 1809; *Ch. canescens*, Lois., Notice, 1810 ("Description imperfect," A. Braun); *Ch. muricata*, Hartmann, Skan. Flora, 1843; *Ch. condensata* et vars. *subflexilis* et *erythrella*, Wallm., 1854; *Ch. Karelini*, Lessing, Novit. Fl. Ross. in Linn., 1834; *Ch. erythraea*, Hering, in herb. Schimper; *Ch. dioica* et *Ch. sphagnoides*, Griffith, posth. papers.

Stem low, mostly simple or sparingly branched; cortical cells

large, equalling the number of the leaves, completely encircling the stem ; the nodes of the cortex numerous, armed with spines usually three from each node, of about equal length, as long as the diameter of the stem ; the spines so numerous that the stem is completely hidden by them. *Stipules* double, directed upward and downward, two at the base of each leaf, the upper longer than the lower, as large as the spines, about as long as the first internode of the leaves. *Leaves* 8—10, usually 9, in a verticil, short, somewhat incurved ; internodes 4—7, usually 5, corticated like the stem, haplostichous, except the terminal segment, which is naked and simple, rarely articulated, and with the whorl of bracts of the last node, which are nearly as long, forming a terminal tuft. *Bracts* verticillate, equally developed all around the node, usually much longer than the sporangium, except three very short extra bracts subtending the sporangium, which seem to stand in the place of the antheridium, sometimes the middle one of these three "bracteoles" is elongated to nearly the length of the sporangium. *Sporangia* oblong-oval with 15—16 whorls on one side, coronula somewhat connivent (in American forms) rather short. Nucleus black, with 12 to 15 sharp angles on one side; in one form (*pachysperma*) broadly oval, in another (*leptosperma*) narrowly oblong. Antheridia very rarely seen ; the plant propagating itself by parthenogenesis. Dioecious.

I have considered the American plant a distinct variety, on account of its large seeds (nuclei 620 μ long ; in the European forms from 350 to 560 μ long) ; indeed, it seems to occupy a position nearer the following species (*Ch. evoluta*) than the European forms do.

The larger form (*pachysperma*) was gathered in 1860 by the writer on the shore of Great Pond, Montauk Point, Long Island. The pond at that time was fresh, or slightly brackish from the occasional breaking of salt water over the bar which separated it from the sea. Since then an inlet has opened and the pond has become nearly as salt as the sea, and though searched for repeatedly the plant has not been found there since. *Ch. aspera*, then found in company with *Ch. crinita* (as it frequently is), has disappeared also from that pond, though it may still be found in Fort Pond, a few miles distant, associated with *Ch. delicatula*, Ag. Forma *leptosperma* has been found at Polpis, Nantucket, by Mrs. Maria L. Owen. In the brackish lakes of Western Canada Prof. Macoun gathered, along with *Ch. evoluta*, some plants which approach very closely to *Ch. crinita*. They seem to be dioecious (no antheridia could be discovered), and to lack the small bracteoles in front of the sporangia, and they have large nuclei.

Prof. Nordstedt writes that *Ch. crinita* exhibits, in rare specimens, some tendency to the development of secondary cortex-tubes.

CHARA EVOLUTA, Allen (*in lit. ad* Prof. Nordstedt, 1881).—*Euchara, diplostephana, haplosticha* (vel *sub-diplosticha*), *monica*.

Humilis, 1—15 centimm. alt. Caulis aculeolis numerosis armatus, haplostiche vel *sub-diplostiche* corticatus ; aculeolis binis fasciculatis, caulis diametrum aequantibus. Folia verticilli 9—10, plerumque 9, haplostiche corticata ; articulis 4—5 (saepissime 5) corticatis, ultimo nudo bi-cellulari ; articulis fructificationem gerentibus 3—4. Foliola omnium geniculorum evoluta, verticillata, sporangio longiora,

exceptis duobus brevioribus antheridia lateralibus, postica vix breviora. Corona stipularis sursum et deorsum evoluta, cellulis elongatis, seriei superioris articulum foliorum infimum aequantibus. Sporangium 11—12-striatum; coronula brevi, sub-connivente; nucleo atro, oblongo, 660μ long., $375-410\mu$ lat., striis a latere inconspicuis (leiopyrena) 9—10.

This very interesting *Chara* was collected by Prof. Macoun of the Canadian Pacific Railway Survey, in July, 1879, in the brackish water of the Red-deer Lakes and in ponds west of the Saskatchewan.

From *Ch. crinita*, Wallr., it differs in being monoecious, and in the character of the cortex; but its general habit is exactly like that of *Ch. crinita*, Wallr., indeed among the specimens sent by Prof. Macoun are found a few, apparently dioecious, which I am unable to distinguish in any way from that species.

In *Ch. crinita* a node of the cortex develops a spine from each of the three external cells, so that the spines are fasciculated in threes. In this species but two of the cells develop spines, the central cell a long spine and one lateral cell a short one, while the other lateral cell remains undeveloped, or protrudes in the form of a small "button," (Fig. 2, a) or elongates somewhat, partially forming a secondary cortex-tube. A section of one of these partially developed tubes is shown in Fig. 3, a. Another feature of this plant exhibits its close relationship to *Ch. crinita*, namely, the smaller bracts on each side of the antheridium. In *Ch. crinita* three small bracts stand in front of the sporangium, the central one of which seems to occupy the place of the antheridium; in this place the antheridium occupies just the place of the central bract. *Chara crinita*, developing an antheridium instead of the central bract in front of the sporangium, and a secondary cortex-tube in place of a lateral cortex-spine, would nearly represent *Ch. evoluta*.

Another fact of significance is the discovery of an almost identical and similarly intermediate species in Central Asia. Prof. Nordstedt, in a recent letter to the writer, says: "I have discovered (in Braun's MS.) under *Ch. contraria* some remarks by Braun concerning *Ch. Altaica*, Br., ined. This species seems to stand very near your *Ch. evoluta*. Braun writes: 'This seems to me most nearly related to *Ch. crinita*, from which it is clearly different in being monoecious. The cortication of the leaves is like *Ch. crinita*, namely, above and below each bract only one cortex-cell, but under the antheridium there seem to be but two cells. On the stem, the cortex is very remarkable; at times the secondary cells are entirely wanting, at times there is one, at others there are two, but all are never developed, as a section proves. In this respect *Ch. Altaica* varies between the type of *Ch. crinita* and *contraria*, and *Ch. strigosa* and *aspera*; the cells are all very thin as in *crinita*, while in *strigosa* they are thick. The dorsal bracts of the leaf-nodes are elongated, and all the bracts connivent, also a peculiarity of *Ch. crinita*. *Ch. crinita* has, but rarely, traces of intermediate cortex-tubes.'"

From this description it would seem that the Asiatic species had developed slightly farther than the American.

The cortication of the leaf of *Ch. evoluta* presents no marked

variations from that of *Ch. crinita*. In the latter species there is a regular haplostichous cortication. Even the three small bracteoles have a cortex-tube for each, though often irregularly developed in the lowest node of the leaf, the centre bracteole may send a tube to the base of the leaf and the lateral ones be imperfectly developed; or the lateral bracteoles may send down a tube while the central bracteole may be imperfectly developed between them.

In *Ch. evoluta* the development is also irregular; most frequently in the lowest node of the leaf three tubes are sent down, one from the base of the antheridium and one from each lateral bracteole; but the lateral tubes are usually small and often abortive (as in Fig. 5, c) in the upper node. The terminal segment of the leaf is not always two-celled, but sometimes one-celled and not longer than the surrounding bracts.

CHARA EXCELSA, n. sp.—*Euchara*, *diplostephana*, *perfecta*, *diplosticha*, *monoica*.

Humilis, statura et habitu *Ch. contrariam* aemulans. Caulis aculeolis sparsis armatus, diplostiche corticatus, seriebus cellularum primariis prominulis. Folia verticilli 7–8, plerumque 8, articulis 5–6, fructificationem gerentibus 2–3; segmento ultimo nudo, bicellulari, saepe elongato; foliis diplostiche corticatis. Foliola omnium geniculorum evoluta, verticillata sporangio longiora, postica vix breviora. Corona stipularis sursum et deorsum valde sed inequaliter evoluta. Sporangium 16–18-striatum, coronula brevi obtusa; collo sporangii elongato. Nucleus ater, ovalis, 15–16-striatus, striis sub-prominulis, 750–800 μ longus.

This plant has the general appearance of *Ch. evoluta* and *crinita*, but is less spinescent. The cortex is almost regularly diplostichous, the primary series being much more prominent. Now and then the secondary series of cells extend past each other, and even additional tubes are developed, as in *Ch. aspera*, so that a section of the stem does not show just twice as many cells as there are leaves in the verticil. The spines of the stem are exceedingly variable in length, sometimes more than double the diameter of the stem, sometimes appearing as simple papillae. The stipules are also very irregular in size, some being more than double the length of others, the longest equalling the lowest node of the leaf. The leaves are regularly corticated in two series, and the terminal, naked segment, even in maturer plants, is often much elongated and two-celled. The bracts are verticillate, much longer than the sporangia, and present the general aspect of those of *Ch. crinita* and *evoluta*. The form of the sporangium is quite peculiar in the elongated neck, with short, round, thick cells at the top.

This species was collected in Canandaigua Lake, in August, 1881.

Chara aspera, (Dethard.) Willd.—*Sub-triplosticha*, *dioica*.—"Usually below medium size and correspondingly slender. Cortex of the stem incompletely triplostichous, for the cells of the secondary series overlap and unite obliquely; the primary series often somewhat more prominent. (In our American specimens the cortex is extremely irregular, as may be seen by referring to the figures, which are exactly true to nature). Spines single, very variable in number

and length, sometimes slender and sharp-pointed, sometimes short and very blunt. Stipules usually quite large but variable (in var. *Macounii*, Allen). Leaves 6 to 11 (usually 8) in a verticil, consisting of 3 to 7 (usually 6) corticated internodes and a naked tip, sometimes two-celled. Bracts on all the nodes; on the upper sterile nodes shorter, often inconspicuous; on the fertile nodes of the female plants there are usually 3 shorter, posterior, and (including the main bract, in place of the antheridium) 5 longer anterior bracts; of these the main bract is sometimes shorter, sometimes longer than the others. On the male plant the bracts are in general shorter than on the female, usually only two long anterior bracts, by the side of the antheridium. Sporangium oblong, with a short, broad, truncated coronula. Nucleus black, with inconspicuous angles, 440–500 μ long; striae on one side of the sporangium 14–16, on the nucleus 13–14. On the subterranean parts of the plant, small globular bulb-lets."

"Very variable in size and vigor, but usually with very slender stems, and slender leaves, mostly straight and rigidly spreading, rarely curved outwardly or inwardly. Color a clear green, light or dark, usually grayish with incrustation when old; in salt water more vigorous, yellowish or brownish green and but slightly incrustated. The length of the leaves varies greatly, but very long leaves are unknown, while there are short-leaved forms (forma *brachyphylla*). The bracts are sometimes much longer than the sporangia, sometimes of equal length or even somewhat shorter; also the spines, always slender and straight, are often several times longer than the diameter of the stem, equal to it or shorter, rarely so short as to be almost unnoticed (forma *sub-inermis*). In young plants the terminal naked segments of the leaves may be greatly elongated (*Ch. fallax*, Ag.) On all forms, but most frequently on those growing in fresh or brackish water, are found chalky-white, globular tubers, which are situated on the nodes of the rootlets, seldom on the subterranean, defoliated and decorticated nodes of the stem; these are sometimes single, sometimes in groups of 2 to 5 and are nothing else than modified rootlets, formed of a single cell, filled with starch granules. Sometimes an ordinary filiform rootlet bears at its tip one, or even a whole bunch of such tubers. While the upper part of the plant dies in winter, these rootlets survive and give rise to new shoots, from the upper extremity of the tuber, or from a root-node on which the tuber is borne. Male and female plants are equally common and are found together." (A. Braun.)

The above comprehensive description, by Prof. Braun, embraces a great variety of forms from different countries. The forms of true *Ch. aspera* hitherto found in America are from New Mexico (Wright, 1857, No. 561); Long Island (Allen, 1860–1881) and Canada (Prof. Macoun, Canadian Pacific R. R. Survey, 1879–1880; brackish ponds west of Saskatchewan, etc.) All of these collections belong to the long-bracted and long-spined form, except the following marked variety, which I had ventured to consider a distinct species:

Var. *MACOUNII*, (*Ch. Macounii*, Allen in litt.)—Caulis aculeolis sparsis, inconspicuis, sub-inflatis obtusis armatus. Folia verticilli 6–8, plerumque 8; articulis 8, internodiis elongatis; sinistro torta.

Sporangium 10-12-striatum, coronula connivente, nucleo 8-9-striato. Foliola anteriora 3, sporangio multo breviora, posteriora inconspicua. Stipulae minutae. Nucleus niger, 450-475 μ longus. Antheridium 550 μ diametro.

The striking peculiarities of this variety are the torsion of the leaves (to the left, upward) ; the minute blunt spines ; small stipules and very short bracts ; the connivent cells of the coronula ; and the small nucleus with fewer angles. All these differences would readily serve to distinguish this form as a distinct species, were it not for the fact that the *aspera* group is already large and its individuals difficult to distinguish. Doubtless they all have a common origin, and the variations are such as differences of climate, water, etc., determine. I have not found any bulbs on the specimens from Prof. Macoun, nor indeed, were any found on his *Ch. aspera*, nor did I succeed in collecting them on Long Island. The plants in this country seem to be in fruit in mid-summer. Our female plants seem to be longer leaved with more open verticils ; and the male plants have, for the most part, shorter incurved leaves with one less node. The variety *Macounii* differs but little from *Ch. fragifera*, Dur., which is dioecious, has small bracts and stipules and long and slender twisted leaves ; but the cortex is *perfectly* triplostichous. A long-leaved form of *Ch. fragilis*, Desv., sometimes has twisted leaves (forma *streptophylla*=*Ch. Hedwigii*, Ag.)

Chara fragilis, Desv., (*Ch. vulgaris*, L., in part).—*Triplosticha, monoica*.—"Medium size, relatively slender and rather rigid. Stem completely triplostichous and *symmetrically corticated, smooth*. Leaves in a whorl, 6-9, usually 7-8, for the most part slender and rigid, with 5-8 corticated segments and a very short tip of 1-2 naked cells. Stipules commonly very small, consisting of two series of small papillae, the cells of the upper row larger, those of the lower smaller and only partially developed. Bracts on the dorsum of the leaf obsolete ; on the upper sterile nodes all are often undeveloped ; the anterior bracts of a fertile node, usually 4 in number, including the prebracteoles, are sometimes shorter, sometimes equal to, sometimes longer than the fruit, and the two anterior (prebracteoles) are always the longer pair. Antheridia and sporangia single. Fruit oval or elongated, larger than *foetida* and *aspera*. Coronula elongated, with a conical, connivent or erect, rarely slightly divergent, tip. Incrustation thin. Nucleus black, elongated, with sharp angles and sharp spines, 550-660 μ long. Striae on one side of the sporangium 15-16, on the nucleus 13-14. Usually of a fine green color, often a dark lake-green, always somewhat incrustated, when more incrustated grayish-green, and when dry whitish-gray (*Ch. hirta*, Meyen). The incrustated forms are very brittle. On the leaves of the sterile verticils there are scarcely any bracts. In deep water the species is perennial, living by means of sprouts from the lower nodes of the stem ; in drier places, annual. Very variable in size, length and thickness of leaf (forma *longifolia* et *brevifolia*, *tenuifolia* et *crassifolia*) as well as the length of the bracts, which has given rise to numerous untenable species." (A. Braun.)

This species, like *Ch. foetida*, A. Br., is found all over the world,

but rarely in salt water. In the United States it seems to be the most common species, being reported everywhere. It grows to a considerable length, with long slender leaves, in running water, or becomes very small and compact in still ponds. Multicellular tubers are formed on the lowest nodes.

Specimens have been found as follows: Maine, Prof. O. D. Allen. Vermont, at Charlotte (forma *microptila*), Mr. Pringle; in Willoughby Lake (*tenuior longifolia*), Messrs. Horsford and Faxon; at Ferrisburgh, Mr. Faxon. Massachusetts, at Boxford, Messrs. Faxon and T. F. Allen; at Natick and Cambridge, Mr. Faxon; at other places by Rev. Mr. Morong. Connecticut, at New Haven, Prof. O. D. Allen; in Litchfield County quite common, T. F. Allen. New York, at Albany, Mr. Peck; at Penn Yan (forma *macroptila* var. *barbata*); in the lakes of Western New York, especially in Hemlock and Honeoye Lakes, and common in the lakes in the Adirondacks, T. F. Allen. Illinois (forma *longifolia major*, var. *Hedwigii*), Dr. J. Schenck. Iowa, J. C. Arthur and Prof. Bessey. California, Dr. A. Kellogg (forma *macroptila*). Yellowstone Park, in the hot Geyser Springs, temperature 100° F., finely in fruit, but with only two elongated bracts, the lateral bracts very minute, herb. Gray, collected during Hayden's Survey.

(*Ch. delicatula*, Ag., by some considered a variety of *Ch. fragilis*, grows in Fort Pond, Montauk Point, Long Island. It is incompletely triplostichous; the stem is armed with small spines; the stipules are well developed; and the bracts are verticillate, but the dorsal ones small. Intermediate forms are known between this species and the typical *fragilis*.)

DESCRIPTION OF PLATE XVII, *Ch. inconnexa*.—A represents the plant, natural size. Fig. 1, a lower sterile verticil. Fig. 2, a higher verticil with naked leaves and with one node fertile, one quite sterile, and the stem corticated with a disconnected series of primary, node-bearing cortex-tubes. Fig. 3, an upper verticil, showing three (of the seven) leaves, one with a single fertile node, with the lowest internode corticated like the stem; one with two fertile nodes, the lower of which has a perfect double cortex, the upper an imperfect cortex, and one sterile leaf without any node whatever. Fig. 4, a section of the stem showing the relation of the cortex-tubes to each other. Fig. 5, the terminal articulation of a leaf with its short mucronate cell. All the figures are magnified 100 diameters.

EXPLANATION OF PLATE XVIII, *Ch. crinita*.—A represents the normal size of the plant. Fig. 1, a portion of the stem with triple spines (less numerous than in nature, when they completely hide the stem); large double stipules equalling the lowest joint of the leaves; the long, verticillate bracts; the short coronula of the sporangium; and, at *a*, the three bracteoles subtending the sporangium. (The male plant I have never seen.) Fig. 2, terminal nodes of a leaf, showing the one-celled, naked terminal, surrounded by long bracts. Fig. 3, a section of the stem. Fig. 4, a nucleus from Montauk Point (forma *pachysperma*). Fig. 5, nucleus from Nantucket (forma *leptosperma*).

EXPLANATION OF PLATE XIX, *Ch. evoluta*.—A and B represent the natural size of the plant; B though small is perfectly mature, with full-sized sporangia. Fig. 1, the stem with double spines, double stipules and one leaf with three fertile, two sterile nodes and a two-celled, terminal, naked segment, magnified 30 diameters. Fig. 2, a portion of the stem, showing at *a*, *b*, and *c* the partial development of one cell of a cortex-node into a cortex-tube, magnified 30 diameters. Fig. 3, a section of the stem, showing at *a'* a section of one of the incompletely developed secondary cortex tubes. Fig. 4, the point of one of the bracts (or spines) magnified 120 diameters. Fig. 5, the anterior aspect of a leaf (the two lowest nodes) showing at *a*, *a*, the site of the antheridium; at *b*, *b*, the central cortex-tube, in the lower node cov-

ering the whole segment but tapering below, in the upper node extending down to fill the gap above the sporangium; at *c, c*, lateral tubes, in the lower node dilating below, in the upper, larger above, on the right and on the left nearly obsolete; at *d, d*, regular tubes from the bract. The group of three tubes arises from *one bract-node* of the leaf. The exact development of cells at the base of this node is not known; it seems to have some peculiarities which require investigation with fresh specimens. Figs. 6 and 7, nuclei with faint striae.

EXPLANATION OF PLATE XX, *Ch. excelsa*.—A, plant natural size. Fig. 1, stem and verticil, showing variable cortex-spines and stipules. Fig. 2, a section of the stem, showing slight deviation from a regular diplostichous type. Fig. 3, two nodes of a leaf, with verticillate bracts. Fig. 4, terminal node of leaf with an elongated, naked, two-celled tip. Fig. 5, tip of one of the bracts (magnified 250 diameters). Fig. 6, one of the mature sporangia, showing the elongated neck, and short, blunt cells of the coronula. Fig. 7 and 8, mature nuclei, with 15—16 sub-acute angles. The figures (except Fig. 5) are magnified 35 diameters.

EXPLANATION OF PLATE XXI, *Ch. aspera*.—A, a male plant of the ordinary form (from Long Island), natural size. B, a female plant of var. *Macounii*, natural size. Figs. 1–3, from normal form (*macroptila*). Fig. 1, a portion of the stem, showing the irregular formation of the cortex, and the base of a verticil showing the large stipules. Fig. 2, portion of a leaf bearing sporangia, with long verticillate bracts; coronula somewhat divergent. Fig. 3, portion of a leaf from the male plant. Figs. 4–6, from var. *Macounii*. Fig. 4, stem, verticil and portion of leaf of a female plant, showing small blunt spines, irregular cortex, minute stipules, minute bracts, connivent coronula and the torsion of the leaf. Fig. 5, part of leaf of male plant. Fig. 6, terminal node of a leaf (not always with a *two-celled* naked segment, but often only one-celled). Fig. 7, a cluster of bulblets from the rootlets of a European specimen. These consist of a simple sack filled with starch granules of varying size, the largest averaging 70 μ in diameter, the interstices between the larger granules being densely packed with smaller ones. Fig. 7, *a*, one granule magnified 100 diameters, showing a black cross with polarized light. Figures all magnified 40 diameters.

EXPLANATION OF PLATE XXII, *Ch. fragilis*.—A, plant natural size with bulblets at the underground nodes. B, a verticil and leaf magnified 25 diameters; 8 and 9, and δa and σa showing two terminals, the single-celled one more common. C, an enlarged bulb, and a section showing numerous cells filled with starch granules. D, a node beginning to deposit starch in the nodal cells. The starch seems to form in the extremities of the main tubes of the stem, in the base of the leaves and in the cells surrounding the base of each leaf, thus giving rise to a very complicated tuber. The thickening of the tuber around the base of the leaves is well shown in the magnified tuber. Fig. 10, a nucleus.

On the Development of the Root-stock of *Dicentra cucullaria*.

By JOSEPH SCHRENK.

(Plate XXIII.)

When we examine this plant in December or January, we find that many of the singular bulblets of which the bulk of its subterranean portion consists, begin to push forth buds from near their bases, on the inner side (toward the axis). At this time we find these buds in various stages of development: some are mere protrusions above the epidermis, others show plainly one or two rudimentary leaves surrounded by several scales or bracts (Plate XXIII, Figs. 1 and 3). The more advanced buds have an elongated axis beset with large membranaceous bracts, which, overlapping one another, envelop the axis. In the axils of these bracts there are found miniature bulblets, either singly or in clusters, shaped like the large ones from which the buds have started; only at their upper end we discover a rudimentary, but very plainly tripartite leaf-blade incurved toward the axis (Fig.

4, *bb.*, and Fig. 5). This rudimentary blade attains a greater size and development on those bulblets that grow at the top of the axis.

In every vigorous shoot we find, near the end of the axis, one, or often two leaves which are so far advanced in growth that the entire structure of the full-grown *Dicentra* leaf is plainly discernible. They even have a greenish tinge, although closely wrapped up by the bud-scales and growing under ground. But besides having an almost fully developed lamina, such perfect leaves are remarkably different in regard to their petioles from the ones with only rudimentary blades. With these, the bulblet itself is simply a greatly enlarged, roundish-triangular leaf-stalk, bearing at its top a mere vestige of a lamina, while the well-developed blade of the former is borne on an elongated, typical petiole, which only at its very base presents an evident, though comparatively slight swelling (Fig. 4, *pt.* and Fig. 6, *a.*) At the flowering time (in April), when the leaf-blades have fully expanded this slight swelling of the petiole-bases has increased enormously (Fig. 7.); and when in summer the foliage has withered away, these enlarged petiole-bases persist and help to form the singular subterranean stem of our plant. They then remotely resemble beech-nuts in size and shape, but the edges are not so sharp, and the inner side is flat. We can easily recognize them by the triangular, dark brown scar left at the top where the thinner part of the petiole has withered away.

The minute bulblets, which I mentioned above as growing in the axils of the bracts on the elongating axis, do not develop their rudimentary leaf-blades at all, but soon lose nearly every trace of them, retaining only a small incurved point at the top. But their mass increases very considerably, while the axis to which they belong, and at the top of which the real leaves are growing, does not lengthen in proportion, so that at the end of the growing season these bulblets are found crowded under and around the large persisting petiole-bases described above. Their outer sides are not concave, but rather convex (Fig. 2), and in size they vary very much, some being as small as millet or hemp seeds, while others are as large as grains of wheat or even of corn. They have of course no scar at the top, the initial blade of their early stage of development having been absorbed or transformed into a smooth blunt point.

On the ground of these observations we might distinguish two sorts of "granulate bulblets" growing on the root-stock of *Dicentra cucullaria*, viz., 1st, metamorphosed petiole-bases, and 2nd, abortive leaves. Their physiological functions are, no doubt, identical; and, in regard to structure and contents, there is not much essential difference; the bulblets of both kinds contain numerous fibro-vascular bundles scattered through the bulk of large parenchymatic cells that are crowded with starch-granules; but in bulblets of the first kind there are from three to five strong principal fibro-vascular bundles (Figs. 6 and 7) while there are no such fibres in those of the second kind (Fig. 2).

Every one of these bulblets is provided at its base with a bud, which eventually produces a new axis during the next season, while, at the same time, new axial organs spring from the main stem. It is,

therefore, evident, that an old root-stock will form a conglomeration of branches, and will have a coral-like appearance when the bulblets are removed.

It is not quite easy to decide from actual observation, whether the buds morphologically belong to the bulblets, or to the axis on which the latter are inserted. In the former case, we should have one of the rather rare occurrences of abnormal bud-production from petioles. But, I think, we can plainly distinguish a narrow zone of tissue in the bulblet at the point of its insertion, that morphologically belongs to the axis. But this zone, from which the incipient bud is differentiated, is, together with its bulblet, very easily detached from its axis, and then gives rise to a new individual plant.

EXPLANATION OF PLATE XXIII.—(For figure of entire plant see Gray's Struct. Bot. p. 204, where, however, the thin portion of the petiole ought to be represented as proceeding from the *top* of the bulblet.

Fig. 1. longitud. sect. of last year's bulblet with bud at the base (December). Fig 2, cross-sect. of the same.—Fig. 3, the same with elongating axis; *lf*, leaf; *br*, bracts.—Fig. 4, longitud. sect. of vigorous shoot (in December) separated from root-stock, the large lower bracts removed; *rt*, root breaking through overlying tissue; *bb*, new bulblets in axils of upper bracts; *pt*, petiole-bases (the blades belonging to them are cut off); *a*, end of axis, all magnified. Fig 5. cluster of bulblets between two bracts (in December), taken from the axil of a lower bract on shoot in Fig. 4. Fig. 6,* sections of petioles in December, and Fig. 7, in April: *a*, longitud. sections showing bud at base; *b*, cross-section from base, *c*, from middle and *d*, from top of thickened portion; *e*, from upper (thin) part of petiole.

New or Little-Known Ferns of the United States. No. 12.

By D. C. EATON.

36. *Polypodium Swartzii*, Baker.—Rootstock very long and slender, chaffy with narrow ferruginous scales; fronds scattered, short-stalked, thin-membranaceous, smooth, oval to linear-lanceolate, $\frac{1}{4}$ to 5 inches long, 3 to 5 lines broad, entire or sinuate; veinlets visible, reticulated, paracostal areoles long and narrow, next ones much larger, oblique, outer ones much smaller and irregular; fertile fronds longer than the sterile, and soriferous on short included veinlets in the largest areoles only, the sori thus in a single row each side of the midrib. Syn. Fil., p. 357. *P. serpens*, Swartz, Mettenius, Hooker, but not the *P. serpens* of Forster.

Climbing on stems of shrubs and small trees, often several feet above the ground; at the north end of Key Largo, Florida; A. H. Curtiss, Feb. 21, 1882.

I have to thank Mr. Davenport for a specimen of this interesting little fern. It was discovered in Santo Domingo nearly two hundred years ago by Plumier, who gave but a slightly exaggerated figure of it under the name of "*Lingua Cervina scandens, angustis et undosis foliis*." He remarked that the fronds are all drooping because of their very slender stalks. Linnaeus gave no account of this plant; but it has been recognized by most later writers on the West India

* Fig. 6, the lettering of which was accidentally omitted, is to the right of Fig. 7.

ferns. I have specimens from Santo Domingo (Weinland, 33), Cuba (Wright, 799) and Porto Rico (Garber, 41).

Mr. Davenport informs me that Mr. Curtiss has collected a large stock of this fern, and will distribute it in his fascicles for 1882, which will probably contain also *Asplenium serratum*, *Taenitis lanceolata* and the royal palm, *Oreodoxa regia*.

37. *Pellaea densa*, Hooker.—The range of this fern is greatly extended by Prof. O. D. Allen and his son, Mr. J. A. Allen, who found it on Mount Albert, in Lower Canada, July 30, 1881. It grew exposed to the sun on the steep walls of ravines at 2,000 to 3,000 feet elevation. Mt. Albert is near West Longitude $69^{\circ} 30'$, N. Lat. $47^{\circ} 15'$. The same plant is No. 819 of Mr. Cusick's Oregon distribution.

38. *Phegopteris calcarea*, Fée.—A second station for this very rare plant is at Decorah, Winneshiek Co., Iowa, where it was found last season "in the crevices of the north side of a limestone bluff" by Mr. E. W. Holway. My specimens were kindly sent by Mr. J. C. Arthur, of Charles City, Iowa.

39. *Aspidium aculeatum*, var. *scopulinum*, Eaton.—This has been reported in the BULLETIN from Utah, by Mr. M. E. Jones. The Messrs. Allen collected it July 26, 1881, on the side of a rocky ravine on Mount Albert, Lower Canada. Mr. Suksdorf sends it also from Mt. Adams, Washington Territory. Some of Mr. Lemmon's plants seem to show so gradual a transition of this into *A. mohrioides*, that it would look as if the latter would have to be considered an extreme form of *A. aculeatum*.

40. *Aspidium trifoliatum*, Swz.—Mr. Curtiss has now distributed fine specimens of this tropical fern. Mr. Davenport has received from Dr. Engelmann a specimen collected long ago in Western Texas by Lindheimer. That region of Western Texas has scarcely been visited by botanists for many years, and not a few of our rarest ferns are found principally there.

41. *Woodsia obtusa*, var. *GLANDULOSA*, is the name suggested by both Mr. C. E. Faxon and myself for the form called *W. Plummerae* by Mr. Lemmon. The involucre is exactly that of *W. obtusa*, the habit scarcely differs, and the glandular pubescence is so variable, often almost lacking, that no reliance can be placed upon it for a specific distinction. This fern has been badly mixed by collectors with *W. Mexicana*. The affinity of the latter is rather with *W. scopulina*.

42. *Ophioglossum vulgatum*, L.—Falcon Valley, Washington Territory, Suksdorf, 1881. Mr. Davenport kindly sends me this, and with it very immature plants of what is probably the same thing from near San Diego, just collected by Dr. Parry.

Torenia Asiatica is a pretty little hot-house plant of trailing habit, which will thrive excellently well out-of-doors during the summer. It has a prismatic calyx, two-lipped, and with sharp angles. The corolla is "short, funnel-form or tubular, with an inflated throat, 4-lobed, the upper lobe (sometimes slightly notched) outermost in the bud." The extreme portion of all but the upper lobe is of a deep

violet-purple, shading below into lavender, but with the dark color



Fig. 1.

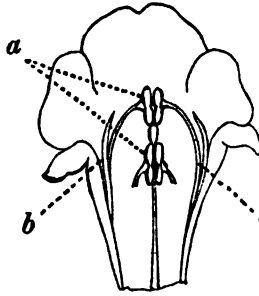


Fig. 2.



Fig. 4.

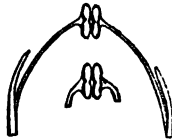


Fig. 3.

resumed in the throat. The lower lobe shows a sort of arched portion extending down towards the ovary. With the exception of this conspicuous dark margin, it is of much lighter color than the rest of the corolla.

One who has given any attention whatever to the cross-fertilization of flowers by means of insects, would at once suspect this plant of some neat mechanism. The irregular and showy corolla and the peculiar stamens warrant an investigation. The stamens (didynamous) are extremely unequal in length. The lower pair arches and converges under the upper lobe of the corolla, in the form of a bow, while the shorter pair is included in

the tube. Both have the anthers contiguous and, indeed, quite coherent, so that it requires some little effort to separate them. The lobes in either pair are so far divergent as to present themselves end to end, in a vertical position. The connective is large and broad. Each of the outer pair of filaments shows some distance above its adnation to the corolla, a filiform appendage, pointing forward and slightly inward. Pressure upon these, one at a time, or better, upon both simultaneously, at once deflects the staminate bow, which, upon removal of the exciting force, resumes its normal position. It would seem as if a large insect like a bee, visiting this flower, and alighting upon the convenient platform of the lower corolla-lobe, and straddling its arch, as he would have to do, would of necessity touch the filiform processes, depressing these little levers, and by throwing the anthers forward, receive more or less pollen on his back. I take the flower to be proterandrous, and think the anthers of the larger stamens open first. I have assured myself of the fact that the two-lipped stigma does not open until at least the second day after anthesis. It then bends forward from its hitherto erect position. The style is kept in place by the shorter stamens, which themselves form a bow, as will be seen in the figure. They do not, however, prevent the deflection of the stigma. Around the base of the ovary is an annular disk, within which a shallow cup is formed, perhaps containing nectar, but this I have not proved. The shorter pair of stamens, it should be said, has no appendage.

It so happens that my attention has been directed to *Torenia* so late in the season that I have not been able to determine what kind of insects would here visit it. What is here written is merely to

direct attention to the plant, which I cannot but think exhibits a pretty adaptation of means to ends.

Fig. 1 represents a front view of the flower. Fig. 2 shows the corolla laid open so as to display the filiform appendages *a*, and the anthers *b*. Fig. 3 represents the androecium. Fig. 4 shows to the left the gynoeceum, and to the right the magnified stigma.

Brown University, Providence, R. I. W. WHITMAN BAILEY.

Notes on *Andropogon Jamesii*, Torr.—Dr. Torrey described this grass in the Annals of the New York Lyceum, Vol. i, 1824, p. 153, from specimens obtained by James on the Canadian River, and named it *A. glaucus*. Muhlenberg having already given this name to another species, Dr. Torrey changed his *glaucus* to *Jamesii* in Marcy's Report, 1852. Steudel, in his Synopsis Plantarum Graminearum, p. 392 (1855), probably not knowing of the second name given by Dr. Torrey, called it *A. Torreyanus*, under which name it has been distributed by American collectors: (No. 845 E. Hall, Texan Plants, No. 3635* A. H. Curtiss's distribution N. Am. Plants, and in the recent distribution of "Pacific Slope Plants" by Pringle.) T. S. Brandegee collected this grass at Cañon City, Colorado, and it was called in "Flora of Colorado," *A. argenteus*, Ell.

In comparing my specimens with Grisebach's description of *A. saccharoides*, Sw., there appear to be no essential points of difference, and as he (in Flora of the British West Indies) cites Arkansas and New Mexico among the habitats of this species, the supposition is that he includes with it our *A. Jamesii*, Torr. By the kindness of Mr. Watson I have been enabled to compare the spikelets of the *A. saccharoides*, Sw., (*vide* Grisebach) with those of our *A. Jamesii*, or *Torreyanus*, and the opinion that they were of one species seemed to be confirmed. The only difference noted was that in the West Indian *A. saccharoides* the hairs on the rachis were a little shorter, the fertile spikelet a little longer and the leaves pilose near the base, differences of no specific importance. In a lot of specimens of *A. Jamesii* from Texas there was a considerable variation in the size of the panicle. It is well known that many species when growing in the dry regions of the Southwest become highly glaucous when elsewhere they are not at all so.

Supposing our *A. Jamesii* to be the same as *A. saccharoides*, Sw., and I believe that it is, then Torrey's name must give place to that of Swartz, and we would have:—

Andropogon saccharoides, Sw., Flor. Ind. Occ. i, 205. (1797).

= *A. argenteus*, D C., Cat. Monsp. 77 (*teste* Nees).

= *A. glaucus*, Torrey in Ann. Lyc. N. Y. i., p. 157. (1824).

= *A. Jamesii*, Torr. in Marcy's Report. (1852).

= *A. Torreyanus*, Steud. Syn. Gram., p. 392. (1855).

Description:—Culms simple or branched and geniculate below, smooth except at the nodes, which are sometimes pubescent with stiff, erect or appressed hairs; sheaths smooth, shorter than the internodes; ligule obtuse, a line long. Leaves smooth or pilose near the base, 3-6 inches long, 1-3 lines wide, with very acuminate-pointed and minutely scabrous tips—the upper leaf very narrow and usually less than one



inch long. Panicle long exserted, $\frac{1}{4}$ of an inch long, the numerous erect or but slightly spreading branches single or in pairs, simple or branched, varying in number and length, smooth below. Rachis of the spikes jointed, each joint $1\frac{1}{2}$ lines long, flattened, densely bearded on the edges, hairs at the base of each spikelet a little shorter than or (usually) exceeding it by a line or so. Pedicel of the neutral floret flattened and bearded like the joints of the rachis, 1-2 lines long. Outer glume oblong-lanceolate, flattened on the back, $1\frac{1}{2}$ to a little over 2 lines long, 7-9-nerved, more or less silky villous below, smooth above, strongly scabrous near the tip and on the upper portion of the angle made by the infolding of the narrow margin; second glume a little shorter and more pointed than the first, 3-nerved, ciliate on the inturned margin, very smooth on the back; third glume neutral and without a palea, very thin and transparent, oblong, obtuse, $1-1\frac{1}{4}$ lines long; fourth glume without a palea, fertile scarcely wider than the long (5-6 lines) twisted and more or less geniculate scabrous awn into which it passes. Rudimentary floret of a single empty lanceolate glume $1\frac{1}{4}$ -2 lines long; a second glume and sometimes also an imperfect awn is present.

Dr. Torrey, in his description, says: "Nodes smooth, leaves very smooth on both sides, stipule obsolete, palets two, shorter than the glumes, the lower terminating in a slightly contorted awn. The other portions of Dr. Torrey's description agree with that given above. He mistook the nature and relative position of the "palets," or as he had it, "*corolla*," which he said was "two-valved." There are two valves within the two outer glumes, but they are the lower palets of two flowers, the lower one being neutral, and both destitute of upper pales; and it is the upper one which is awned.

F. LAMSON SCRIBNER.

Notes on the Trees of the South-west.—The San Francisco Mountains here mentioned are in the extreme eastern part of Arizona, just north of the Gila and west of the San Francisco River. The Burro and the Bear Mountains extend in a north-westerly direction, from points a little to the west of Silver City, to the Gila River, being separated from one another by the Mangus basin. The Bear Mountains are the northern ones. The Mogollon Mountains are situated in the extreme western part of New Mexico, between the Gila and San Francisco Rivers, a little north-east of the San Francisco Mountains.

The only wooded sections are in the mountains, and the hills near them, and along the streams.

Fouquieria splendens, Engelm.—This plant, although a shrub, is introduced here on account of the general use to which the wood is put by the Mexicans. It is very peculiar, and, in flower, it is handsome. It is commonly known as "coach-whip cactus," or simply "coach-whip." It is very largely used by the Mexicans in South-western Arizona for fencing, the poles being set up contiguously in trenches, and bound by a row placed horizontally near the top. The thorns render such a fence impassable. The plants are also occasionally used for roofing-poles.

Prunus Capollin, Zucc., is, with the exception of the mahogany,

the only fruit-tree that I have found in the South-west, and the fruit of this is poor enough. It grows in the rich, light soil of the cañon-bottoms, attaining a size a little greater than that of *Prunus Virginiana*. It is very prolific.

Sapindus marginatus, Willd., is known in South-western New Mexico as "China tree." It grows with a single straight trunk, and reaches a height of 10 or 12 feet, and occasionally has a diameter of 6 inches. The fruit is said to be of value in malaria. I have sometimes had occasion to use the wood for ramrods, and have found it very light and strong. It grows in light soil along streams and valleys at the base of the mountains.

Negundo aceroides, Moench., grows commonly along mountain streams. It reaches a diameter of about 12 or 15 inches.

Prosopis juliflora, DC.—Legumes extensively used for horse-fodder, when grain cannot be obtained.

Fraxinus pistaciæfolia, Torr.—This polymorphous species is abundant along all mountain streams, in rocky places, often growing in rock-crevices where no soil is apparent, with its feet variously flattened and deformed to fit the crevices. The leaves vary much as to form, margin and surface, being from ovate-oblong to obovate, and from glabrous to short tomentose. Like most of the hard-wood timber of the Gila country, it is very subject to decay, but when sound it is highly valued for the purposes for which white ash is commonly used. It is apparently the material of which the pre-historic people of the Gila formed their bows.

Chilopsis saligna, Don., grows only near water, and delights in a sandy soil. It is one of the most beautiful of trees when in flower. It occasionally has a diameter of nearly or quite a foot. The wood resembles that of the black walnut in color, though somewhat lighter and with a satiny gloss. It would apparently be valuable for cabinet-work, as it is beautiful, and capable of taking the peculiar and handsome polish of sumac.

Celtis reticulata, Torr.—This species was observed only in the Burro Mountains. The wood is very white, smooth, sound, compact and heavy, and would apparently be valuable for turning purposes. The trunk is very short, seldom reaching a height of more than three feet before forking, and the branches are crooked and branching, so that no large pieces of the wood are available.

Morus microphylla, Buckley.—Very common in open cañons of the Burro Mountains, and mountains southward. It reaches a height of 20 feet, and a diameter of 6 to 9 inches. The fruit, though small, is sweet and pleasant when ripe. The trunk is variously flattened, twisted and distorted, and the bark is seldom entirely continuous except in small specimens.

Platanus Wrightii, Watson.—Common and abundant in the mountain cañons, being the predominant tree of the cañon of the Mogollon Mountains. The trunk is usually very crooked, and grain more winding than in any other species.

Juglans rupestris, Engelm. Common in cañons and valleys along and near the Gila, where it grows to rather a larger size than Rothrock's description credits it with. Near Mangus Springs there

are two large specimens, one having a trunk not far from $1\frac{1}{2}$ feet in diameter. The wood is as valuable as that of *J. nigra*, and the small nuts are rich and sweet.

Ophioglossum vulgatum.—This fern has not yet been credited to the Pacific coast, though its presence here has been suspected. Mr. and Mrs. Lemmon collected it last year in Arizona. In February, 1850, Dr. C. C. Parry collected it at San Diego, but he obtained only a few specimens, which were lost while en route to New York.

To-day, Dr. Parry and I rediscovered this plant growing upon the high mesa, near the public school building. We collected it in many places, widely separated. We found it with *Dodecatheon Meadia* (var.), *Saxifraga Parryi*, a small form of *Selaginella rupestris*, and a liverwort. It grows in grassy, and often stony spots, which are not specially wet; indeed, some of them are quite dry. During a large portion of the year the soil in which this fern grows is dry and hard.

No doubt, if botanists will go down upon their knees, a little close observation will result in the finding of this fern at other points in this State, and perhaps in Oregon.

San Diego, California, March 7th, 1882.

D. CLEVELAND.

Hybrid Oaks.—When I settled here some thirty years ago, I found on the grounds of a Germantown gentleman, Jeremiah Hacker, a bearing tree of the European *Quercus Robur*. I have since raised hundreds of young acorns from this isolated tree. These have borne, and young trees from these have had acorns. I have two generations of fruiting trees from this single one. I can say from this experience that like usually begets like, but here and there remarkable leaps occur. Now, it may be, a tree has leaves wholly sessile, another may have leaves with petioles a quarter of an inch long. I have had instances of trees with leaves as nearly entire as those of a chestnut oak, while others would have them so deeply lobed as to be fairly pinnatifid. And the acorns vary. Some are very little longer than broad, while others are double the length, and form perfect cylinders. How or why these strange leaps occur I could never satisfy my mind. That they are not due to hybridization is certain. That it must be owing to some innate power to change, is equally clear, whatever the nature of that power may be. An interesting fact in connection with these occasional great leaps from the common form is that the change, once secured, is almost as hereditary as are the features of the parent form. Here and there, as in this parent, there will be a sudden departure, many often in the direction of the original, though not always so. I could give many illustrations from other trees, as well as from this one English oak.

The conclusion that I have been forced to is that the odd forms we often find in nature are not necessarily hybrids, but are as likely, if not more likely to be the outgrowth of some internal law of form with which we are as yet unacquainted. That they do not often perpetuate themselves is remarkable when we remember that of thousands of seeds produced on any one tree, but a very small per-

centage ever gets a chance to form, and of those which do sprout, again but a small percentage survives to become bearing trees. As the number of trees reproducing the general features of the original may be as a hundred to one of the more strikingly aberrant forms, we may see that though individual instances may be common, we are never likely to meet many trees of one stamp. Once in a while an individual tree may find itself in a situation favorable to the preservation of a number of seedlings, which might endure till again reproductive; and in such cases a marked variety may originate and make its way over the earth.

I have often thought it probable that in time a few individuals of these suddenly introduced forms might again leap into new features, and then if they should be able to sustain themselves, we should have new species quite independently of any principle of natural selection; that principle, as I understand it, being governed chiefly by "environment."

Germantown, Pa.

THOMAS MEEHAN.

Eleocharis nodulosa, Schultes, Nees (*E. consanguinea*, Kunth., En. Pl. ii, 148.)—This *Eleocharis* was collected by Mr. C. G. Pringle in Arizona last summer. It is a South American species "not before known to be a native of the United States." This is but one of the numerous and interesting additions to our flora made by Mr. Pringle during his collecting tour in Arizona and California last season. In his sets of Pacific Slope Plants it is ticketed "*Eleocharis*.—By streams of the Santa Catalina Mountains, June 27."

Thanks are due Mr. Wm. Boott, of Boston, for the proper determination of the species.

The following description is drawn from Pringle's specimens:

Culms about 20 inches high, terete, knotted with approximate transverse septa, densely tufted from a creeping rootstock, sheathed at the base, leafless. Spike ovate-lanceolate, about three-fourths of an inch long, pointed; scales closely imbricate, oblong or oblong-lanceolate, obtuse, 1-nerved, membranous, with a broad hyaline tip and margin. Achenium obovate-pear-shaped lenticular, minutely striate with punctate dots, and also very slightly transversely wrinkled, brownish-olive, crowned with a flattened, conical tubercle. Bristles 4-7, about the length of the achenium, downwardly barbed stamens, two or more, usually one.

F. LAMSON SCRIBNER.

Notes from Massachusetts.—In his teratological notes in the January BULLETIN, Mr. Trimble mentions *Cirsium lanceolatum*, Scop., with pure white flowers. I also noted a whole colony of the same extending some distance along a roadside in Hadley, Mass., last summer. The soil was a stiff clay, parched and cracked with drought. It would be interesting to note if these conditions produced the form, and if it would persist the second year.

Erigeron strigosus, Muhl., var. *discoideum*, noted by Robbins in Uxbridge, Mass., I have found in this region.

Lychnis Flos-cuculi, L., seems to be well established in a meadow

in this town. Flowering in June, it is so abundant as to give the whole field of several acres a bright pink tint.

Quercus palustris, Du Roi, is quite common in this locality, and, in every specimen that I have examined, the acorns are marked with longitudinal stripes of bright orange-color. I find no mention of this in Gray, or in Emerson's *Trees of Massachusetts* or in Michaux's *Sylva*, and am at a loss to explain it. If it is a characteristic of the type it would seem of sufficient importance to merit mention. If merely a form it is interesting, and perhaps marks a hybrid between the type and *Q. coccinea*, Wang., var. *tinctoria*. Will some one who knows volunteer an explanation?

Amherst, Mass., March 20th, 1882.

W. E. STONE.

Vegetable Fibres in the Oriole's Nest.—A nest of the *Icterus Baltimore* sent me from Westchester, N.Y., by Mr. W. D. Abbott, proves to be made of the fibres of *Asclepias Cornuti*, and lined with tawny wool from the fruit of the buttonwood, *Platanus occidentalis*. The liber-cells of the *Asclepias* are $\frac{3}{4}$ of an inch long, very slender, and pointed at both ends. If the bark could be gathered in sufficient quantity it would make a very fine, soft, silky and tough paper, unlike any now made in the country.

D. C. EATON.

Note on Alder Catkins.—I find, upon careful examination in my usual haunts about this city, that the *male* catkins of the alders seem to have very generally failed this year. It might be well to observe whether this is so elsewhere. Can any one guess the cause? In many years of herborizing I never knew them scarce before. Now it is difficult to find any, and the few detected are stunted and poor.

Providence, R. I.

W. W. BAILEY.

Botanical Literature.

A Synopsis of the North American Lichens: Part I., comprising the Parmeliacei, Cladoniei and Coenogoniei. By Edward Tuckerman, A.M. Boston, S. E. Cassino, 1882.

The long-felt want of a guide to the North American Lichens is at last supplied, and in a manner which leaves nothing to be desired. It is now thirty-four years since the first *Synopsis* by the learned author was published; and that, though it gave the best descriptions of our lichens in the language, had become to a large extent obsolete through the advance in knowledge both of the anatomy and of the species of these most difficult plants; and the difficulties in the way of ordinary students in their study were almost insurmountable. The microscope, which, in 1848, had hardly been applied to lichens, has revealed new wonders and rendered necessary modifications of the system then adopted, though this in its basis is not substantially changed. The *Genera Lichenum* of the author presented these modifications in a very able and learned manner, and in the present work we have its application in the study of our species. In mechanical appearance the book is a worthy companion to the *Genera*, one of the best printed botanical works ever issued in this country, and it is only to be regretted that some errors of the press have escaped correction.

The descriptive portion of the work is preceded by an introduction giving a concise account of the outlines of lichen structure, in which there is yet noticeable a certain reserve, and a gratifying absence of dogmatism on a subject in which there are still so many disputed points, and where so much yet remains to be studied. The question of the autonomy of lichens is considered to have been settled by the researches of Dr. Minks, whose remarkable investigations into the intimate structure of these plants should be better known. Following the introduction is a list of the most important works on the subject.

Of the systematic and descriptive portion we can only speak in the highest terms. The system of the Genera, based on that of Elias Fries, is followed with slight modifications. The subdivisions and groupings of the genera are admirably calculated to lead the student to finding the proper place of a plant under observation. The diagnoses of species are in every way admirable; clear and concise, neither deficient nor redundant, the best we are acquainted with in any language, they will enable any student with the aid of a microscope of moderate power (say from 350 to 600 diameters) to determine any of our lichens, so far as possible (for the most experienced lichenists often find it difficult to do this) without an authentic specimen before him for comparison. In such studies as those of Dr. Minks, however, a much higher power is required.

The key to our author's method is to be found in his remark that "the interest of the study of lichens lies in the resolution rather than the over-estimation of difficulties," hence we find him ever aiming at a comprehensive and philosophical view. Those who look for a multiplication of species and varieties will not find it here; but, instead, an admirable grouping of related forms in which the sub-species of the author are in most cases the species of other writers, with whom, as has been observed to us, "every remarkable species becomes a genus, and every remarkable variety a species." What shall constitute a "species" in lichens is so much a matter of opinion that the method of this book is in every way preferable. In a full "Lichenographia" more attention would be given to minor differences, and to points of structure; but for inexperienced students, such as are most of us in this country, this Synopsis is a far better guide. The prominence given to habit is another excellent feature not to be lost sight of, and we approve of the absence of all reference to the uncertain chemical tests on which so much reliance is placed by European lichenists. The book must be the standard and guide of American students in the future, and it is to be hoped that it will not be long before the second and final part is given to the public.—H. W.

The Names of Herbes. By William Turner (A. D., 1548). Edited (with an Introduction, an Index of English Names, and an Identification of the Plants enumerated by Turner) by James Britten, F. L. S., of the British Museum. Trübner & Co., London, 1881.

"Thys litle boke," says the quaint old author (writing in 1548)

"cōteineth the names of the moste parte of herbes, that all auncient authours write of both in Greeke, Lattin, Englishe, Duche and Frenche, I haue set to also the names which be cōmonly vsed of the poticaries and cōmon herbaries. I haue tolde also the degrees of so many herbes as Galene the chiefe Doctour of al phisicians hath written of, and because men should not thynke that I write of it that I never sawe, and that Poticians shoulde be excuselesse when as the ryghte herbes are required of thē, I haue shewed in what places of Englande, Germany, & Italy the herbes growe, and maye be had for laboure and money, whereof I declare and teache the names in thys present treates."

This extract from the author's preface sufficiently indicates the scope of a work which, now very rare and costly, is at length made accessible to all botanists through this reprint by the English Dialect Society, and rendered, by the labors of an accomplished editor, of more *practical* value than the original edition.

Mr. Britten has divided the work into three parts. The first is an exact reprint of the original, the only alterations being in the pagination, and of the insertion, at the foot of each page, of the "fautes escaped in the printyng" (which are again found collected on page 90) and of certain errata that Turner had overlooked. The second part consists of an alphabetically-arranged list of the English names given by the author (whether invented by him or in popular use in his time), each name being followed (1) by its modern scientific equivalent, (2) by the Latin heading under which Turner places it, and (3) by the page of the reprint on which it will be found. The third part is an index in which the modern Latin names of the plants are given in alphabetical order, followed by the various English ones by which they are mentioned in the body of the work.

Altogether, the work forms a fitting companion to the "Dictionary of English Plant-Names," of which Mr. Britten is one of the authors. It will certainly find a warm welcome among those who love the study of botany in its widest sense, and the gratitude of all such is due to Mr. Britten for placing it within their reach. ♦

A Manual for the Preservation of the larger Fungi (Hymenomycetes) in their natural Condition, by a new and improved Method; also a new Process for the Preservation of Wild Flowers. By James Lake English. A. B. Davis, Epping, 1882.

In an article on the "Preservation of Pileate Fungi for the Herbarium," printed in one of the numbers of the BULLETIN last year, it was stated that the only person who had successfully solved the problem of preserving the fleshy fungi with the exact form and color that they presented in the living state was Mr. J. English. This gentleman having concluded to make known to the world his method of procedure, has published a small book of directions with the above title. To even hint at the method would be unfair to the author, who is entitled to all the profit that he can derive from the sale of his work; and we can, therefore, only recommend the latter to the favorable consideration of those interested.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at the Herbarium, Columbia College, Tuesday evening, Feb. 14th, with an attendance of nineteen members and one visitor. In the absence of the presiding officers, Dr. O. R. Willis occupied the chair.

Dr. Willis exhibited some fresh specimens of *Opuntia vulgaris* and *O. Rafinesquii*, remarked upon their supposed differences and gave the results of his cultivation of the plants. The conclusions reached were that the two forms were scarcely distinguishable from each other.

Mr. Britton exhibited fibres of the *Bromelia sylvestris*, from Yucatan, and remarked upon their economic value.

Two persons were elected active members, and one a corresponding member of the Club.

The President appointed the following standing committees :

Herbarium and Library Committee : N. L. Britton, P. V. LeRoy, A. Hollick and Miss E. G. Knight.

Finance Committee : Hon. Addison Brown, J. L. Wall and Dr. L. Johnson.

The regular meeting of March 14th was held in the geological lecture-room of Columbia College, the President in the chair and nineteen members and six visitors present.

Mr. Hollick, of the Herbarium Committee, reported on the state of the herbarium, and announced the recent addition of 150 species thereto.

Mr. Britton reported on the state of the library.

Dr. O. R. Willis remarked on the annual growth of rings in exogenous trees.

Prof. Schrenk gave the result of his examination, for the last two or three years, of *Monotropa*, the conclusion reached being that the plant is not parasitic on the roots of the trees under which it grows. Prof. Schrenk's description of the roots of this plant, with their investing mycelioid substance intermingled with spores, agreed precisely with that recently given of the roots of the same species by Dr. F. Kamiensky, in Europe.

Dr. T. F. Allen presented a paper on the "Development of the Cortex in *Chara*," and gave a brief abstract of it.

The President exhibited and remarked upon a number of drawings of fossil plants from the Tertiary deposits of Green River, Wyoming Territory, and also showed a specimen of an undescribed *Lygodium* of very variable form.

Mr. E. S. Miller exhibited specimens of *Viola pedata*, var. *bicolor*, showing a tendency to become concolorous.

Dr. Willis presented to the library a copy of his recently-published "Flora of Westchester County (N. Y.)."

One person was elected an active member, and one name was proposed for corresponding, and two for active membership.

We are pained to announce, just as the BULLETIN is going to press, the death of our colleague, Mr. William H. Leggett, which occurred Tuesday morning, April 11th. A more extended notice will appear hereafter.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. IX.]

New York, May, 1882.

[No. 5.]

New Species of Fungi. *Catalogued*

By CHAS. H. PECK.

(Plate XXIV.)

PHYSARELLA, *Gen. nov.*

May, 1882

N. G. F.

Sporangium pervious to the base, the interior walls forming a persistent, spurious columella; capillitium composed of filaments, with here and there minute knot-like thickenings, straight tubes containing lime-granules extending from the exterior to the interior walls of the sporangium, persistently attached to the former.

A genus of Myxogasters belonging to the Physaraceae, and related to the genus *Physarum*, which, as amended by Rostafinski, is quite comprehensive and includes species that are externally quite unlike in appearance. I at first regarded our plant as an aberrant species of it, and have made it known under the name *Physarum mirabile*. But, upon more mature consideration, it seems to me that the characters above-indicated make it worthy of generic distinction. The spiniform cross-bars, which are wholly independent of the rest of the capillitium, alone furnish a character too, distinctive to be overlooked. The following species is the type of the genus:

PHYSARELLA MIRABILIS.—Sporangium cup-shaped or subinfundibuliform, minutely rough or squamulose, reddish-yellow or tawny-yellow, rupturing irregularly, the exterior part persistently adherent to the top of the stem, the interior remaining entire and forming a persistent, hollow, yellowish, spurious columella slightly broader above and open at the top; capillitium composed of pale slender filaments, and yellow thickenings of two kinds, one, minute scattered swellings in the filaments, the other, long and spine-like, extending horizontally from the exterior to the interior walls of the sporangium and persistently attached to the former by their broader extremity, conspicuous after the dispersion of the spores; stem equal or slightly tapering upward, reddish-brown; spores globose, smooth, blackish-brown, .0003 of an inch in diameter.

Plant about one line high, on decaying wood, leaves and bark. Autumn. Michigan, Dr. D. N. DeTarr. Pennsylvania, Dr. Geo. A. Rex.

After the rupture of the sporangium and the dispersion of the spores, the threads of the capillitium remain for a time like a flocculent mass attached to the spurious columella. The spiniform tubes or cross-bars taper toward the interior walls of the sporangium, and, when this is ruptured, they break away at their inner extremity and remain fixed by their outer extremity to the exterior walls. In

a vertical section of the unruptured sporangium they may be seen in position, imbedded in the mass of spores. The colored scales upon the surface of the sporangium vary considerably in size in different specimens.

CALICIOPSIS, *Gen. nov.*

Receptacle oblong-urceolate or subcylindrical, at first closed, then open and pulverulent at the apex, stipitate.

A small *Calicium*-like fungus, which does not well agree with the characters of any genus known to me, has fallen into my hands, and the present genus has been founded upon it. It partakes to some extent of the characters of some of the small substipitate species of *Cenangium*, but its more slender habit, long stem and urceolate or subcylindrical receptacle, which soon becomes pulverulent above, separate it from that genus. These same characters and its less tough or corneous substance forbid its reference to the genus *Tympanis*.

CALICIOPSIS PINEA.—Scattered or caespitose, about one line high, glabrous, shining, black; stem slender, straight or curved, slightly thickened at the base, often growing from a cluster of black sphaeriform perithecia which contain spermatoid bodies; receptacle narrowly urceolate, sometimes a little curved or inclined to one side, slightly exceeding the stem in diameter, soon brownish-pulverulent at the apex; asci oval or subelliptical, long-pedicellate, eight-spored; spores crowded, simple, elliptical, colored, .0002-.00025 of an inch long.

Bark of living pine-trees. Vermont, C. G. Pringle.

The peculiar form of the receptacle is suggestive of the dry capsules of some mosses, particularly of some species of *Hypnum*. The sphaeriform bodies and their spermatoid contents are probably only another condition of this fungus. The young stems are at first pointed, but as they increase in length they become more obtuse and finally the apex develops into the receptacle. Although the plant resembles some species of *Calicium* it is wholly destitute of any thalline crust and gonidial cells, and must be deemed a fungus. The genus should be placed among the Patellariei near *Cenangium*.

EXPLANATION OF PLATE XXIV.—Fig. 1, a piece of decaying wood bearing six plants of *Physarella mirabilis*, one of them with the sporangium ruptured.—Fig. 2, two plants magnified.—Fig. 3, vertical section of the sporangium of a magnified plant showing the spine-like cross-bars imbedded in the mass of spores.—Fig. 4, a magnified plant with the sporangium ruptured and the spores dispersed.—Fig. 5, filaments from the capillitium with one of the knot-like thickenings $\times 400$.—Fig. 6, a spine-like cross-bar containing lime-granules $\times 400$.—Fig. 7, four spores $\times 400$.—Fig. 8, a piece of pine-bark bearing several plants of *Caliciopsis pinea*.—Fig. 9, a tuft of four plants magnified, two of them mature and two immature; also sphaeriform bodies at the base.—Fig. 10, two asci containing spores $\times 400$.—Fig. 11, six spores $\times 400$.—Fig. 12, six spermatoid bodies $\times 400$.

New Western Plants.

By EDWARD LEE GREENE.

BIGELOVIA (APLODISCUS) PARISHII.—Arborescent, 6-12 feet high; leaves lanceolate, 2 inches long, 3-5 lines wide, entire, with acute

tips, sub-coriaceous, strongly punctate, glutinous, heads numerous, in crowded corymbs terminating the erect branches, small, 10-12-flowered; involucre turbinate, the scales few, irregularly imbricated, lanceolate, acute, with a green midrib, but no green tips; style-appendages filiform-subulate, a little longer than the stigmatic portion; akenes turbinate, minutely silky.

San Bernardino Mountains, California, S. B. and W. F. Parish, No. 571, collected in September and October, 1881.

A well-marked species, the largest of its genus, and most related to *B. arborescens*, Gray.

MADIA (MADARIA) CITRIODORA.—A villous-hirsute, lemon-scented annual a foot high; stem simple, leafy up to the corymbose summit; leaves all alternate, entire, 2 inches long; heads small, in a rather close, corymbose panicle; scales of the involucre with short tips; rays short and inconspicuous, greenish-yellow; akenes short and thick, for the genus, and rounded on the back, like those of *Hemizonia*, not wholly enclosed by the involucre scales; chaff of the receptacle free.

Hills about Yreka, California, collected by the writer in June, 1876.

The species is rather anomalous by its akenes, which are as near those of a *Hemizonia* as of a *Madia*; but it has strictly the habit of the latter genus, and its aspect is that of the smaller forms of *M. elegans*, Don.

HEMIZONIA (CALYCADENIA) HISPIDA.—Stem virgate, stout and rigid, 1½-3 feet high, scabrous, and somewhat hispid; leaves narrowly linear, 1-3 inches long, clothed toward the base with long setose-hispid hairs, and bearing a tack-shaped gland at summit; heads large, paniculate, or in short-peduncled, axillary clusters; rays 3-5, sulphur-yellow, deeply 3-cleft; akenes of the ray commonly smooth except on the angles and at the summit; those of the disk usually clothed throughout with a short, appressed, silky pubescence, and bearing a pappus of about 10 nearly equal subulate, barbellate-scabrous, chaffy scales.

Collected by the writer on a sandy plain in Merced County, near Atwater Station, California, in September, 1881.

In technical character the species is near *H. Douglasii*, Gray; but it is sufficiently distinguished by its stout, coarse habit, and the much larger size of all the parts of both its flowers and fruit. Dr. Gray considered it too near *H. spicata*, Greene, which was published in the BULLETIN for February, but that has, together with its white, or rose-tinted rays, very differently shaped, and almost white-villous ray-akenes.

HYMENOPAPPUS ROBUSTUS.—Floccose-tomentose; stem about 2 feet high from a biennial root, stout and rigid, simple up to the corymbose summit, leafy throughout; none of the leaves entire, all but the upper cauline 2-3-pinnately parted, the lobes linear, entire; heads large, in a loose, or, more commonly, rather compact corymb; scales of the involucre 10-12, obovate, with petaloid margins; akenes very villous; pappus half as long as the corolla-tube, its spatulate scales coarsely lacerate-toothed.

Common on the sandy plains of New Mexico; obtained by almost all collectors in the region, and heretofore referred to *H. flavescens*, Gray; but that is a perennial, inhabiting higher altitudes, is always less robust, has its lowest radical leaves perfectly entire, and all the others less finely divided than in this very distinct species.

HIERACIUM RUSBYI.—Stem about 2 feet high, leafy to the top, paniculate, bearing numerous, small, 15–20-flowered heads; leaves oblong-lanceolate, 3 inches long, entire or sparingly denticulate, those of the stem sessile and clasping, all clothed on both surfaces, but especially along the veins beneath, with long pilose hairs; peduncles glabrous, involucre nearly so; flowers yellow; the ribbed akenes short, columnar, truncate at the apex; pappus brownish.

Mogollon Mountains, New Mexico, Aug., 1881. H. H. Rusby.

Dr. Gray writes that the species exists in the first New Mexican collection of Mr. Charles Wright. It is, therefore, without doubt, the plant referred to *Crepis ambigua*, Gray, in Pl. Wright. i, 129, and mentioned again in Pl. Wright. ii, 106, as “a true *Hieracium*.”

HIERACIUM BREVIPILUM.—Stem a foot or two high, leafy only toward the base; lower leaves oblong the upper linear-lanceolate, remotely denticulate or entire, 3–5 inches long, pubescent with short, pilose hairs; heads few, rather large, in an open panicle, on long peduncles which, together with the involucre, are bristly hairy and glandular; ligules apparently greenish-yellow; pappus white or fuscous, barely equalling the fusiform, ribbed and beaked akenes.

Mogollon Mountains, New Mexico, Aug. 1881. H. H. Rusby. Also reported by Dr. Gray as occurring in Mr. Pringle’s recent Arizona collection.

In Mr. Rusby’s specimens the pappus is uniformly bright white, and the plant would thus seem to belong to *Crepis* rather than to *Hieracium*. But Dr. Gray informs me that *H. Fendleri*, Gray, sometimes has its pappus white; and the same is true of *H. Scouleri*, Hook. The species here described much resembles *H. carneum*, Greene, which is now more anomalous in the genus by its rose-purple flowers than by the uniform whiteness of its pappus.

SENECIO RUSBYI.—Stems 2–4 feet high, with more or less of a short, white pubescence, leafy to the top; leaves nearly glabrous, ovate-lanceolate, 3–6 inches long, the lower tapering to a strongly winged petiole, the upper merely contracted above the auriculate-clasping base, acute at apex, the margins strongly dentate with sharp, salient teeth; heads large, nodding, in a rather loose racemose panicle; involucre with a few setaceous bracts at base; scales broad, with a thin, yellowish, membranous margin, and a tuft of short, white hairs at the acute tip; akenes of a light chestnut color; smooth, and strongly striate; pappus barbellate-scabrous.

Mogollon Mountains, New Mexico, collected by Mr. Rusby in August, 1881.

Allied to *S. Bigelovii*, but with smaller and more numerous heads, and a very different involucre. Dr. Gray reports it from the Santa Catalina Mountains of Arizona, collected by Mr. Lemmon.

CUPRESSUS ARIZONICA.—A tall, conical tree 40–70 feet high, with horizontal branches; trunk 2–4 feet in diameter, covered with a dark

red fibrous bark; bark of the branches flaking off in thin plates and leaving a smooth surface; branchlets stout and rather rigid, sharply quadrangular; leaves closely imbricated, very glaucous, neither pitted nor glandular; their margins entire, or, in the very oldest, denticulate; cones crowded on short, stout peduncles, globose, about an inch in diameter, of 6-8 very thick, and strongly bossed scales; seeds numerous, 2 lines or more wide.

This fine cypress was discovered by the writer on the mountains back of Clifton, in the extreme eastern part of Arizona, on the first day of September, 1880.

Abundant specimens of wood, and fruiting branches were secured, and soon distributed, under the above name, to the principal herbaria of this country, and several in Europe, including that of the Royal Gardens at Kew.

In the course of the year and a half that has since intervened, the species has been collected at different points in the southern and eastern portions of the same Territory, by Messrs. Rusby, Pringle and Lemmon. The tree is peculiar in that, while the bark of its trunk is as shreddy as that of any cedar, that of the branches, even the larger ones, is scaly, falling off in thin plates. The wood is light and straight grained, splitting with the utmost readiness; that of the heart being dark red, resembling that of red cedar. The branchlets bear so strong a likeness to those of *Juniperus pachyphloea*, Torr., that without fruit they are hardly distinguishable. It is the principal tree of the mountains which lie to the north of Mt. Graham, and forms dense forests, particularly on the northward slopes.

Notes on New England Algae.

By W. G. FARLOW.

Since the appearance of my paper on New England Algae, I have received a number of interesting species, new to our coast, from Mr. F. S. Collins of Malden, Mass., and Rev. J. D. King, of Edgartown, Martha's Vineyard. In 1881 Mr. Collins sent a specimen, collected near Little Nahant, which resembled a small *Asperococcus*, and which could not at the time be determined. In March of this year he succeeded in finding a considerable number of specimens of the same species in excellent condition, and, through his kindness, I have been enabled to examine both living and dried specimens. The alga in question is of a decided olive-brown color when fresh, and becomes somewhat greenish in pressing, in this respect resembling some of the *Asperococci* and *Punctariae*. The frond is tubular, and resembles strongly the species of *Asperococcus* in habit, but even in its adult condition it is composed of a single layer of cells, which are generally associated in fours and are of a gelatinous texture. Were it not for the distinctly brown color, one would be inclined to consider the plant as a species of *Prasiola*, especially if examined after having been dried. There can be no doubt, however, that it belongs to the *Phaeosporae*, and it appears to me to constitute a new genus (*Phaeosaccion*) of that suborder, differing from other genera in having its tubular frond composed of a single layer of rather

gelatinous cells. The genus must be regarded as one of the lowest of the suborder, simpler even than *Scytosiphon*, where there is more than one layer of cells, and where the surface is covered with plurilocular sporangia and hairs. In *Phaeosaccion* one sees the relationship of the *Phaeosporae* to the *Florideae* in their lowest representatives, the *Porphyrae*, and, on the other hand, to the *Chlorosporae* in the genus *Prasiola*. The fronds of *Phaeosaccion Collinsii* are generally gregarious, and start from a common mass of cells, any of which may grow into a short filament composed of a single row of cells. By a longitudinal division of all except the terminal cell, a frond is formed consisting of two rows of cells ending in a single apical cell. By subsequent transverse and radial divisions, a tubular or saccate frond is formed, composed of a single thickness of cells. The division of the cells into fours is tolerably regular, and, when the plant matures from each ultimate division, there is formed, as far as could be ascertained, a single zoospore which escapes and leaves behind the colorless cell-walls. Only a small number of the specimens examined by me had produced zoospores; and these, at the time of examination, had come to rest, so that it was impossible to tell anything about the number of cilia. On this point further examination is necessary. The genus may be provisionally characterized as follows:

PHAEOSACCION, Farlow.

Fronds olive-brown, tubular, or saccate, composed of a single layer of cells disposed in fours. Hairs wanting. Reproduction by zoospores produced singly (?) in each cell. Cilia?

PHAEOSACCION COLLINSII, Farlow.—Fronds subgelatinous, gregarious, compressed-cylindrical, $\frac{1}{8}$ inch to 1 inch broad, about 2-8 inches long, at first saccate, becoming cylindrical, apex at length ruptured. Cells squarish, $3.8\mu-7\mu$ broad; frond $8\mu-10\mu$ in thickness. On *Zostera*. Little Nahant, Mass., in early spring. Mr. F. S. Collins.

Among the plants received from Rev. Mr. King were fine specimens of *Striaria attenuata*, some of them a foot long. They were washed ashore at Edgartown in January, and Mr. King supposes them to have grown at the mouth of Edgartown Harbor. Some of the specimens perfectly resemble European specimens of the species, and bear the well-known unilocular sporangia in abundance. Some of the specimens, however, are small and slender, and the surface of the branches is covered with plurilocular sporangia, which I believe have never before been seen. The plants bearing the plurilocular sporangia resemble those bearing the unilocular, in microscopic structure, although, as before said, their habit is much more slender; they are, however, solid and not hollow, as is the case with the large specimens, but in its young stage *Striaria* has a solid frond. Were it not that one of the unilocular-bearing specimens sent by Mr. King was as small and slender as those bearing plurilocular sporangia, I should have hesitated to consider the specimens as all belonging to the same species. The unilocular sporangia, which resemble those of *Punctaria*, are found scattered over the larger branches, and sometimes also on the smaller polysiphonous branch-

lets which end in the hairs characteristic of the trichothallic growth of *Striaria*. They arise from the cortical cells, which divide irregularly, and increase in size so that they project in well-marked papillae, above the surface. The general shape of the sporangia is ovoid, but, when several contiguous cells are transformed into sporangia, they become cuboidal or prismatic by pressure. Judging from Mr. King's specimens, the plurilocular plant of *Striaria* is smaller, finer, and less fully developed as to the frond, than the unilocular plant. Whether the plant which bears plurilocular sporangia continues to grow, and afterwards produces unilocular sporangia, I have no means of determining, but such is apparently not the case.

Another interesting plant sent by Mr. King, but only in a very small quantity, is closely related to *Capsicarpella speciosa*, Kjellm., a species afterwards removed from *Ectocarpeae* by Kjellman (Algenvegetation des Murmanschen Meeres, p. 29), who believes that the unilocular sporangia contain a single spore, and not numerous zoospores, and consequently places the species, with one other, in a new genus *Scaphospora*, under the *Tilopterideae*. I have examined one microscopic preparation and one pressed specimen sent by Mr. King, and in both there are unilocular and plurilocular sporangia, which, in general, resemble Kjellman's figure of *C. speciosa* (Bid. Skand. Ectocarp. och Tilopter, pl. i, fig. 3), but which are smaller than the measurements given by Kjellman. Our species more nearly resembles, as far as measurements go, *Sc. arctica*, Kjellm., but is apparently smaller. The species may be provisionally described as new, although farther comparison may show it to be a form of one of the two species mentioned. Furthermore, although in as good condition as is usually the case with mounted specimens of this group of algae, it is impossible to say whether the contents of the unilocular sporangia form a single spore or are going to divide into numerous zoospores. Assuming the former to be true, our plant would come under *Scaphospora*, and is the only representative of the *Tilopterideae* yet found on our coast.

SCAPHOSPORA (?) KINGII, Farlow.—Main filaments 4 inches long, loosely and irregularly branching, cells 70μ – 75μ broad, usually shorter than broad, secondary branches short, revolute, beset with numerous secund, pectinately-compound branchlets, which end in long hairs. Unilocular sporangia borne on the penultimate branchlets, compressed-globose, 45μ – 58μ in diameter, solitary, produced by the division of a branch-cell into two parts. Plurilocular sporangia borne on the ultimate branchlets, 35μ – 40μ broad, 75μ – 150μ long.

Washed ashore at Edgartown, Mass. Rev. J. D. King, January, 1882.

In the month of August, 1881, I collected at Wood's Holl, Mass., a *Gloeocapsa*, which, at the time, was growing in considerable quantity on the eel-grass, but which soon disappeared. I had seen it occasionally in previous years, but never before in condition to describe. Its color is almost precisely that of living diatoms, for which it might pass in the masses of slime in which it generally occurs.

GLOEOCAPSA ZOSTERICOLA, Farlow.—Forming shapeless, gelatinous, brownish masses. Cells flattened-hemispherical, concave on the inner surface, about 19μ – 26μ long by 9μ – 11μ broad, united in twos or fours into colonies of from 40μ – 100μ in diameter, with numerous distinct, enveloping layers.

On *Zostera*, mixed with *Calothrix*, etc. Wood's Holl, Mass., August, 1881.

In my paper on New England Algae, I stated that *Callithamnion versicolor* was known in this country only in its seirosporic condition. Last summer I found specimens at Wood's Holl which showed true favellae and tetraspores also, as are recorded in Europe by Bornet in *Études Phycologiques*, p. 71. A specimen of *Callithamnion Plumula*, collected at Gay Head in September, is of interest as showing antheridia, with regard to which little seems to be known in the sub-genus *Antithamnion*. The antheridia are in oblong tufts formed by the transformation of the ultimate second branchlets, and remind one of Harvey's figure of *Callithamnion polyspermum*, Phyc. Britt., pl. 231, fig. 6.

Fern Notes. IV.

By GEO. E. DAVENPORT.

Aspidium trifoliatum, Swartz.—Dr. Engelmann has very kindly favored me with a portion of a specimen of this fine *Aspidium*, which was collected "in the entrance to a limestone cave, on its perpendicular walls, not far from New Braunfels, Texas," in 1878, by the lamented Lindheimer, who was thus the first to collect this species within the limits of the United States.

Botrychium simplex, Hitchcock.—Mr. W. N. Suksdorf, of White Salmon, W. T., sends a fine, compact, very fleshy, ternate form of this species, the whole plant scarcely more than $1\frac{1}{2}$ inches tall, from Mt. Adams.

Mr. Suksdorf has collected some eighteen species of the ferns of Washington Territory, including two extreme forms of *Botrychium ternatum*, the normal form of *Asplenium Trichomanes*, *Cryptogramme acrostichoides*, *Pellaea densa*, *Gymnogramme triangularis* and *Aspidium aculeatum*, var. *scopulinum*; and the specimens which he has sent me are exceedingly fine and well selected. His sets are desirable, and well worth the price at which he advertises them.

Miss Furbish also collected, last season, *B. simplex* in Bridgewater, Aroostook Co., Me., where she reports it as being quite abundant.

Woodsia Plummerae, Lemmon.—Since my notes for the February BULLETIN were prepared, I have received specimens of this fern authenticated by its author's ticket, and my foot-note (*l. c.*, p. 22) requires modification in so far as it seemingly places this fern with *W. Mexicana*; it is rather a very glandular form of *W. obtusa*, but none the less identical with much of the other collections mentioned, and which appear to be considerably mixed. *Woodsia Oregana*, although normally smooth, is sometimes quite glandular (as in some specimens which I have from Dakota), but in *W. obtusa* the normal form itself is often more or less glandular (a character which does

not appear to be at all constant), so that it does not seem to be worth while to recognize the present fern even as a variety.

Pteris aquilina, L.—A year or two ago, Mrs. S. M. Piper sent me a curiously curled and twisted form of this species which she found growing in Sandisfield, Mass., in 1877; and later on I received indirectly from Jackson Dawson, of the Bussey Institute, specimens of the same form from cultivated plants, which were originally found by him growing in open meadow-land in Georgetown, Mass. The plants had been observed by Mr. Dawson for several successive seasons in considerable abundance, and those taken up by him had since retained their peculiar character.

A similar form has been found many times in England, where it is known as the var. *crispa* of Wollaston, and its occurrence in this country is interesting as a matter of record. Moore describes two forms of it, one with "*undulate and reflexed margins*," and the other with "*crenate and wavy margins*." Deakin figured a portion of it in *Florigraphia Brittanica*, but—very judiciously as it seems to me—did not recognize it as a variety. The plants of this form which I have seen are dwarfed in habit, and their whole appearance indicates an unhealthy, diseased vitality, which, however, might possibly be restored to its normally healthy condition by a special course of treatment adapted to its needs.

A rich Fern-Field.—The presence of *Pellaea aspera*, *P. pulchella*, *P. flexuosa*, *Cheilanthes leucopoda*, *C. microphylla*, typical *Notholaena candida*, *N. sinuata* and *Ancimtia Mexicana* in a package containing some imperfect specimens from Uvalde Cañon, Texas, indicates a region that would well repay exploration by some keen-eyed collector, and it is to be hoped that the time is not far distant when the treasures which this list reveals will be made available for distribution.

Florida Ferns.—Mr. A. H. Curtiss has sent me some very interesting notes on the Florida Ferns which he has collected during his explorations in that State, and later on I may give some extracts from them. The "good things" which this very careful and thoroughly systematic collector has in store for those who receive his fascicles for 1882 will shortly appear, and give others no less pleasure than a knowledge of them has given me *

Medford, Mass., March, 1882.

*Indica form
new form*

Notes on New England Algae.—The following species, observed by the writer, are either new to this region or are from other localities than those given in Prof. Farlow's Manual of the Marine Algae of New England. To the author of that model work the writer is much indebted for assistance in identification, etc., as well as for many similar kindnesses on former occasions.

Rivularia Warreniae, Thuret.—I found this species in August and September 1881, at Marblehead, Mass., where it grew on a rock, above high-water mark, but where the spray formed little pools in

* Mt. Washington, given as the station for *Aspidium Filix-mas* in my account, in the February BULLETIN, of Mr. Pringle's discovery of that fern in Arizona, should have been Mt. Wrightson.

rough weather. The thallus is brownish-olive, in form and consistency somewhat resembling *R. plicata*, Carm., but of different microscopical structure. It is the *Schizosiphon Warreniae* of the Phycologia Britannica, and has not before been reported in America.

Palmella rupestris, Lyngb.—In August, 1880, I found at Hunnewell's Point, Maine, in a locality very much like that of the *Rivularia* just mentioned, a small quantity of this species. It was in a soft jelly-like mass, which contained several other minute algae. This species also has not been previously found in this country.

Porphyra leucosticta, Thuret, I found at Nahant in June, 1879. It was very abundant at that time, the water being almost full of it; but, though I have often visited the locality since, at the same and other seasons of the year, I have never seen it again. It is easily distinguished from the omnipresent *P. laciniata*, Ag., by its softer consistency and delicate rose-purple color; and the microscopical structure is quite distinct, the antheridia forming small spots among the spore-cells, and not a distinct marginal zone. It is a more southern species than *P. laciniata*, and occurs throughout most of Europe. It has not yet been recorded for our Atlantic coast, though Prof. Farlow, in his Manual, considers its occurrence here probable.

At the same time and place that I collected this species, I found a single plant which I think may be identical with the

Ectocarpus brachiatus, Harv., of the Nereis Boreali-Americana. The localities there given are South Boston and Lynn, Mass., and Prof. Farlow, in his work quoted, states that it is known in this country only by Harvey's description. My plant agrees quite well with an authentic specimen of *E. Griffithsianus*, Le Jolis (*E. brachiatus*, Harv.), but, according to Bornet (*Études Phycologiques*, p. 16, note), the structure of this species agrees rather with the genus *Phloeospora*, Areschoug, it having, especially in the larger filaments, a cortical layer of quadrate cells, arranged in regular series. He proposes for it the name of *Phloeospora brachiata*, under which name it would be the only representative of the genus yet found in this country.

Monostroma Blyttii, Wittr., the largest of our species of the genus, is reported in the Manual as growing luxuriantly at Eastport, Maine, but reaching its southern limit at Nahant, occurring there in a reduced form, not generally more than two or three inches long. This diminished size at Nahant is confirmed by my experience, as I have found few specimens there exceeding the dimensions just given; but, rather curiously, at Revere Beach, just south of Nahant, it occurs in October and November in abundance, the fronds sometimes more than a foot high and proportionately broad, growing on shells and pebbles near low-water mark.

Monostroma crepidinum, Farlow, a species founded on a plant growing at Wood's Holl, on the piles of the Government wharf, I found at Juniper Point, Salem, last August. As at Wood's Holl, it grew on the piles of a wharf, near low-water mark, and it seems probable that it might be found in similar stations along the coast, escaping the notice of collectors from its resemblance to the Ulvas so abundant in such places.

Myrionema Leclancherii, Harv., on record at Gay Head only, I have found at Marblehead; and

Gracilaria multipartita, Ag., known north of Cape Cod only in the interesting locality at Goose Cove, Squam, is plentiful in the Mystic River marshes, near Boston.

Saccorhiza dermatodea, De la Pyl., I found growing just below low-water mark round a little island off Marblehead, and I picked up a number of fronds washed ashore at Marblehead Neck; they were nearly, if not quite as large as specimens that I collected in Portland Harbor, Me.

Malden, Mass., March 8, 1882.

FRANK S. COLLINS.

Ophioglossum nudicaule, L. fil.—The *Ophioglossum* collected by Dr. Parry and Mr. Cleveland in San Diego, California, in March and April, proves to be this species, rather than *O. vulgatum*.

The specimens collected in March were too immature to permit of a positive identification, but those which have been collected since are nearly mature, and are certainly nearer to *O. nudicaule* than to any other species.

Some of Dr. Parry's April specimens suggested *O. Lusitanicum* to me, but others in a more advanced state of maturity, since received from Mr. Cleveland, agree very well with *O. nudicaule*, and justify Prof. Eaton's suggestion (*in litt.*) that they belong to that species.

The California specimens are somewhat larger, and, for the most part, more fleshy than my Florida specimens, but show the characteristic disposition of this species to develop two or more fronds from the same root-stock.

In one of Mr. Cleveland's specimens, a root branches in opposite directions, forming a single horizontal rootlet on which two young plants arise from buds produced full three inches apart. The plants vary from $1\frac{1}{4}$ to $3\frac{1}{2}$ inches in height. In most specimens the fleshiness of the lamina wholly obscures the venation, but in others apparently becomes thinner and more membranaceous from age. The venation may be distinctly seen by holding the specimen to the light. The fertile branch arises from the base of the lamina; and the fruit-spike, which is raised on a foot-stalk half the length of the plant itself, bears from 10 to 20 sporangia. Both laminae and fruit-spikes exhibit a tendency toward acuminate apices, though not in so marked a degree as in my Florida specimens.

This species has heretofore been recorded in the United States only from the South Atlantic and Gulf States, and its present discovery (or re-discovery, as it was originally collected in San Diego, by Dr. Parry in 1850, when the specimens were unfortunately lost before being identified) so far away from this region is a most interesting one which may lead to the detection of intervening stations.

As suggested by Mr. Cleveland, some close ground work, with keen eyes, at the right seasons of the year, will probably show that this fern is not so rare as generally supposed.

My thanks are due, both to Dr. Parry and Mr. Cleveland, for specimens in different stages of maturity. A note from the latter, just at hand, states that the little fern is already disappearing, thus

indicating its limited season to be of from six to eight weeks' duration.

Medford, Mass., April 22, 1882.

GEO. E. DAVENPORT.

A propos of a Paper on the Vitality of Seeds.—I think I can understand why a striking article on "The Germination and Vitality of Seeds," by Richard E. Kunzé, M D., is "published by subscription of members of the Club"; but I do not understand why I am reported to give, in "How Plants Grow," "extracts from a paper drawn up by the Rev. Dr. Marks," the said paper being a circumstantial account of the germination in Illinois of some seeds taken from a rose-hip found in the hand of an Egyptian mummy, estimated to be about 2500 years old. I am sure there is nothing of this in "How Plants Grow," and I greatly wonder that any one should have supposed that I should have thought the account, upon the face of it, was worth mentioning, even for the sake of showing that it is quite fallacious. Dr. Kunzé can perhaps explain how he came to connect my name with this narrative.

Cambridge, Mass.

ASA GRAY.

(The above note has been submitted to Dr. Kunzé, who desires us to express his regret for having inadvertently copied an entire paragraph and credited it to "How Plants Grow," while only the first sentence of the note should have been ascribed to that work. The error arose through Dr. Kunzé's somewhat defective eyesight, which led him to overlook quotation-marks. We are informed that Dr. Kunzé has made an explanation to Dr. Gray by letter. The above disclaimer, with these few remarks, will serve to set the matter right with those who have read the paper in question.—ED.)

Notes from Chemung County, N. Y.—In my former notes from this county I neglected to mention that I found *Hydrangea arborescens*, L., growing on the rocks at the Wellsburg Narrows. This was in 1879. I have since found it in a cool ravine one mile west, on the north side of the Chemung, in the town of Elmira. I have no record of its having been found elsewhere in the State. It is certainly quite common in the northern part of Bradford County. I hope it will be looked for by those working in Tioga and Broome Counties, as I desire to know its geographical distribution. The elevation here is about 824 feet above tide-water. May that not influence its range into this State? I have never seen it in Steuben County, whose elevation increases westward. C. D. Fretz, M.D., of Sellersville, Pa., informs me that some years ago he found *Polemonium caeruleum*, L., in a bog near Apalachin, Tioga County, N. Y. I shall look for it there this coming season. Have *Poa caesia*, Smith, *Eriophorum vaginatum*, L., and *Lespedeza Stuevei*, Nutt., been found in New York State? Can anyone give me a station for *Carex cephaloidea*, Dew.?

Lowman, N. Y.

THOS. F. LUCY.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. IX.]

New York. June, 1882.

[No. 6.]

New Species of North American Fungi. *Indexed*

By J. B. ELLIS.

OMBROPHILA ALBOFUSCA. — Orbicular, $\frac{1}{2}$ –1 mm. in diameter, dirty white when fresh, becoming darker in drying; margin very thin and narrow; asci clavate-cylindrical, .0003'–.00035 x .0003'–.0004'; paraphyses filiform; sporidia oblong or oblong-fusiform, hyaline, 2-nucleate, mostly in the upper part of the asci, .0003'–.00045' x .00015'–.000175'.

On bark of *Magnolia glauca*.

PEZIZA (TAPESIA) CORNUTA. — Gregarious, minute, dull white (flesh-color when dry), sessile, thin membranaceous, subfibrous, margin sparsely fringed with straight, 4–5-septate, white, spreading hairs; asci clavate-cylindrical, .002'–.0025 x .00035'–.0004'; paraphyses filiform; sporidia biserial, fusiform, 3-nucleate and at length uniseptate, .0005 x .00015', each end furnished with a short bristle-like appendage.

I have not seen *P. arachnoidea*, Schw., but that is said to be "white villous," while this is only ciliate.

On decaying chestnut-wood. Westchester, Pa., June, 1879.

SPHAERIA (ANTHOSTOMA) MORTUOSA. — Perithecia scattered, depressed, covered by the cuticle, which is elevated, blackened and pierced by the short cylindrical ostiolum; asci cylindrical, sessile, about .004 x .0004'; sporidia uniseriate, broad navicular, 1–2-nucleate, dark brown, .0005'–.0007' x .0003'.

Nearly allied to *Anthostoma italicum*, Sacc. & Speg.

On basal sheaths of old *Andropogon*; also on dead stems of *Polygonum* and *Eupatorium purpureum*, (N. A. F., No. 897.)

SPHAERIA GRAOPSIS. — Perithecia scattered, erumpent, membranaceous, globose or subelongated, partially collapsing above, .001'–.0015' in diameter, rough and more or less covered with fragments of the bleached fibres of the wood; ostiolum papilliform, slightly prominent, surrounded by a slight depression; asci oblong, mostly bulging on one side, sessile, .002'–.0023 x .0008'–.001'; paraphyses none; sporidia 8, inordinate, oblong-elliptical or oblong-navicular, hyaline at first, becoming pale yellowish-brown, endochrome once divided, .0008'–.001 x .00035'–.0004'.

Allied to *S. Eckfeldtii* and *S. inflata*, Ell.

On decorticated pine poles. (N. A. F., No. 780.)

CERATOSTOMA CARPOPHILA. — Perithecia subglobose, .003' in diameter, rough; ostiolum capillary, three times or more as long as the diameter of the perithecia, and more or less crooked or bent; asci slender, about .002' long; paraphyses filiform; sporidia uniseriate or biserial, fusiform, yellowish, .000175'–.00025' long.

The fruit is almost exactly that of *Sphaeria echinophila*, Schw., which is found with it. The perithecia and ostiola are beset with

coarse, erect, scattering hairs, which may be only the erect threads of some parasitic mold.

ASTERINA PLANTAGINIS.—Perithecia innate, hemispheric, .003' in diameter, clustered on brownish, immarginate spots which are scattered irregularly over both sides of the leaf, but more abundantly on the upper surface; asci ovate-elliptical, .001'-.0013' x .0005'; sporidia crowded, oblong, obtuse, hyaline, 2-nucleate, slightly constricted across the middle, .00035'-.0004' x .0002'; mycelium nearly obsolete, consisting of a few brown threads radiating from the base of the perithecia, or entirely wanting.

On living leaves of *Plantago major*. Philadelphia, Pa., Oct., 1881. Dr. Geo. A. Rex. (N. A. F., No. 791.)

SPHAERELLA MAGNOLIAE.—Perithecia buried in the parenchyma of the leaf, either collected in patches, giving the leaf, especially the under surface, a clouded appearance, or sometimes occupying nearly the entire surface; ostiola mostly hypophyllous, barely piercing the epidermis; asci sublancoolate; sporidia mostly biseriata, clavate-oblong, pale straw-color, faintly nucleate, .00025' x .0001'.

Quite distinct from *Sphaeria Magnoliae*, Schw., which renders the leaf bullate.

On fallen leaves of *Magnolia glauca*. December. (N. A. F., No. 800.)

SPHAERELLA HYPERICINA.—Amphigenous. Perithecia minute, erumpent in little tuberculiform clusters of two to six; asci oblong, .001'-.0012' x .00015'-.0002'; sporidia crowded, clavate-oblong, uniseptate, often bent at the middle, yellowish, .0004'-.00045' x .0001'.

On fallen of *Hypericum prolificum*. (N. A. F., No. 797.)

HENDERSONIA XEROPHYLLI.—Perithecia oblong, covered by the epidermis, which is elevated, blackened and fissured longitudinally above them; spores oblong, obtuse, pale brownish, 1-3-septate, the extreme septum mostly very faint, or often wanting.

On fading leaves of *Xerophyllum asphodeloides*. May.

SEPTORIA TRIFOLII.—Perithecia subcuticular, but soon exposed by the peeling off of the epidermis, gregarious, forming little elongated patches, or scattered evenly over the matrix; spores fusiform, curved, granular, .0008' x .00015'-.0002', resembling the spores of a *Cryptosporium*.

On dead stems of *Trifolium pratense*.

SEPTORIA GALIORUM.—Perithecia punctiform, minute, scattered, appearing like little black shining points; spores acicular-filiform, slightly curved, .0008'-.001' long, faintly septate.

On dead stems of *Galium*.

A list of Grasses collected by Mr. C. G. Pringle in Arizona and California during the Summer of 1881, with Descriptions of those Species not already described in American Publications.—Some of these species are not well made out, and may prove new. I much regret that I did not have access to Fournier's work on the Mexican Grasses in the compilation of this list. Those species which appear in Mr. Pringle's distributed sets are marked with an asterisk (*).

1*. *Paspalum distichum*, L., Amon. Acad., v., 391.—Santa Cruz Valley, near Tucson. June.

2*. *Eriochloa punctata*, Hamilton, Prod., 5.

= *Paspalum punctatum*, Flugg., Mong., 127.

= *Milium punctatum*, Linn., Am. Acad., v., 392.

= *Helopus pilosus*, Trin., Agrost., 104.

= *H. punctatus*, Nees. Vasey, in Bot. Wheeler Exped., p. 296.

Santa Cruz Valley, near Tucson.

The same as No. 821 of E. Hall's collection of Texan plants, excepting that the awn of the flowering glume is much shorter than in Hall's plant. There is the same difference between this and West Indian specimens. No. 824 of E. Hall's collection, ticketed *Helopus mollis*, C. Müll., is a species of *Panicum*, named by Buckley, in herb. Acad., Phila., *P. ciliatissimum*.

3. *Panicum sanguinale*, L., Sp. Pl., i., 55. Near Camp Lowell. July.

4*. *Panicum leucophaeum*, HBK., Nov. Gen., i., 97; Vasey, Bot. Wheeler Exped., 295.

= *P. lachnanthum*, Torr., Pac. R. R. Surv., vii., p. 21.

= *Tricholaena insularis*, Griseb., Flor. Br. W. Ind., 557.

= *Andropogon insulare*, L., Am. Acad., v., 412.

Near Camp Lowell. July.

This is the same as No. 722 of Lindheimer's collection of 1847. Reverchon sends it from Texas, and Brandegee from Colorado. Specimens from the South-west differ much in appearance from Florida plants referred to this species, collected by A. H. Curtiss and Dr. Palmer. The culms are not so stout, the leaves are more numerous, shorter and narrower; the panicle is shorter, with fewer and shorter branches, and the wool of the spikelets is whiter. These differences may be due to differences in soil, climate, degree of moisture, etc. The species is widely distributed, being found in the tropical and sub-tropical regions of both hemispheres. The Australian specimens are said to vary much, especially in the degree of the development of the inflorescence (vid. Flor. Austr., vii., p. 472).

5*. *P. capillare*, L., var.?—Culms caespitose, geniculate and branched below, smooth, a little hirsute at the nodes; sheaths somewhat inflated, sparsely pilose, copiously so along the margins above and at the throat; leaves lanceolate, 2-3 in. long, 3-5 lin. wide, scabrous on the margin, with a few long hairs near the base. Panicle virgate, the branches single or in pairs, ascending, the lower ones about 2 in. long. Spikelets $1\frac{1}{2}$ line long, on short and unequal pedicels, pointed; lower glumes acute or pointed, $\frac{1}{2}$ - $\frac{3}{4}$ as long as the second; second glume a little longer than the third, ovate-lanceolate, acute, 7-nerved, slightly scabrous at the tip; third glume in form like the second, 7-9-nerved, neutral, with a palea $\frac{1}{2}$ a line long; fertile flower smooth and shining, obtuse, less than a line long.

Santa Cruz Valley, near Tucson. (No. 464.)

The habit of this grass is well marked, and it may prove a good species. The spikelets are exactly like those of No. 817 of E. Hall's Texan plants, referred to *P. proliferum*, but it differs much from that in its low, branched habit, pilose sheaths, short and rather broad leaves—characters which point to *P. capillare*, L., to which it is doubtfully referred. The habit of the panicle is more like *P. proliferum*, while

the prominently 3-5-nerved, pointed, lower glume and the palea to the third glume are characters not found in Eastern specimens of either *P. capillare* or *P. proliferum*, but point to *P. virgatum*, L. The third glume of the latter, however, is staminate and the fertile flower is more turgid.

6*. *Panicum fuscum*, Swartz.—Santa Cruz Valley, near Tucson. June.

Apparently the same as No. 825 of E. Hall's Texan plants, but more slender, with leaves and sheaths smoother. It is probably the *P. reticulatum*, Torr. (Marcy's Rept.)*

7. *Panicum (Virgaria)* sp., allied to *P. fuscum*, Sw.—Culms prostrate below, rooting at the lower joints, smooth, as are the numerous ascending branches, except just below the panicle; sheaths striate, smooth, slightly inflated, shorter than the internodes; leaves linear, cordate and clasping at the base ($1\frac{1}{2}$ –5 in. long, 3 lines wide), scabrous on the cartilaginous margin, which is also pilose near the base. Panicle at length exerted, 3–6 in. long, the axis and the ascending or erect simple branches finely pubescent, and also sparsely pilose with rather stiff, spreading hairs; the lower branches about 2 in. long, bearing the approximate but not crowded, racemose spikelets in pairs (the upper ones single), one nearly sessile and often imperfectly developed, the other on a pedicel nearly its own length; pedicels pilose and finely pubescent. Spikelets oblong or obovate, somewhat pointed ($1\frac{1}{2}$ line long), the three outer glumes pubescent; lower glume deltoid, obtuse, 5-nerved, $\frac{1}{2}$ as long as the spikelet; second and third glumes sub-equal, as long as the fertile flower, the second 7-nerved, the third 5-nerved, with a palea; nerves with connecting reticulations above. Fertile flower nearly $1\frac{1}{2}$ line long, pointed and transversely rugose, slightly compressed on the back.

Santa Cruz Valley, near Tucson. (465.)

I have not seen this before in North American collections, but it probably belongs to some of the described species allied to *P. grossarium*, L., or *P. fuscum*, Sw. The spikelets resemble those figured in Trinius's Icon. Gram., for *P. velutinsum*, Nees.

8. *Panicum obtusum*, HBK., Nov. Gen., i., 98; Vasey, in Bot. Wheeler Exped., p. 294. Santa Cruz Valley, near Tucson. May.

The same as 960 of C. Wright, and 827 of E. Hall's Texan collection. T. S. Brandegee collected the same in Arkansas Cañon and near Cañon City. (vid. herb. J. H. Redfield.)

9. *Panicum maximum*, Jacq., var. *bulbosum*.—Rocky cañons, Santa Rita Mts., Arizona.

This appears to be a good species, and is referred as above with some doubt. It is like No. 958 of Parry & Palmer's collection in Central Mexico, 1878.

10. *Panicum scoparium*, Lam., Encycl., iv.; Thurber, Bot. Cal., ii., p. 259; *P. pauciflorum*, Ell. ?; Gray's Manual, p. 648. By streams of the Sta. Catalina Mountains.

* Since the note on this species was written, I have seen specimens of No. 2,091 of C. Wright's N. Mex. collection (1851-'52) and find it to be the same. Dr. Torrey, in Marcy's Report, says that No. 2,090 and No. 2,091 of Wright's collection are glabrous and more robust forms of his *P. reticulatum*.

11. *Panicum dichotomum*, L.—By streams of the Santa Catalina Mountains.

12. *Panicum Colonum*, L., Sp. Pl., 2nd ed., p. 84.—Santa Cruz Valley, near Tucson.

13. *Panicum Crus-Galli*, L., Sp. Pl., 2nd ed., p. 84.—Santa Cruz Valley, near Tucson.

14*. *Setaria caudata*, R. & S., Syst., ii., 495; Vasey, Bot. Wheeler Exped., p. 295; *S. setosa*, P.B., var. *caudata*, Griseb., Flor. Br. W. Ind., p. 555.—Pantano, Arizona. June.

15. *Cenchrus tribuloides*, L., Sp. Pl., 1st ed., p. 1,049.—Santa Cruz Valley, near Tucson.

16. *Leersia oryzoides*, Sw., Flor. Ind. Occ., i., 132 (in adnot.).—Santa Cruz River.

17. *Polypogon Monspelienensis*, Desf., Atl., i., 66; Gray's Manual, p. 612.—Banks of the Santa Cruz River.

18. *Polypogon elongatus*, HBK., Nov. Gen., i., 134; C. Gay, Flor. Chil., vi., p. 301; Steud., Syn. Gram., 183.—Culm simple, erect, geniculate at the lower joints, 2-3 feet high, smooth, 4-5 leaved, the dark colored joints contracted; sheaths smooth, the lower equalling the upper, shorter than the internodes; ligule of the upper leaf 2-3 lines long, obtuse, broader than the leaf, and decurrent along the sheath; leaves broadly linear, smooth below, very scabrous on the margins and on the nerves above (3-4 lines broad, the upper one 6 inches long), involute near the tips, and terminating in a sharp, scabrous point. Panicle $\frac{1}{2}$ to 1 foot long (9 inches in Pringle's specimens), narrow, and rather densely flowered, nodding; the erect, or somewhat loosely spreading branches in dense, half-whorled clusters, the shorter ones flower-bearing to the base, the longer ones (2 inches long) naked below, much branched, and flower-bearing above the divisions and sub-divisions, being curiously arranged in little fascicles or umbels of threes and fours; pedicels 2-3 lines long, strongly scabrous, clavate. Glumes empty, slightly unequal, the lower longer, lanceolate, awn-pointed, about $1\frac{1}{2}$ lines, or, including the awn, 2-3 lines long, round and scabrous on the back, aculeolate on the single nerve; flowering glumes $\frac{1}{2}$ as long as the empty glumes, thin, oblong, broadly obtuse or truncate and irregularly 5-toothed at the tip, with a slender, straight, scabrous awn on the back, above the middle, about 1 line long; palea half as long as its glume, irregular at the broad truncate tip.

By streams of Santa Rita Mts., Arizona. (467.)

Both Gay and Steudel make *Novodvorskia agrostoides*, Presl., Rel. Haenk., i., t. 40, a synonym of this. There is a single specimen of the same species without name in herb. Acad. Phil., collected by C. Mohr in Mexico. On the ticket is written: "near *Muhlenbergia distichophylla*, says Thurber." So far as I know, this plant has not before been recorded as growing within our limits.

19. *Hilaria cenchroides*, HBK., Nov. Gen., i., t. 37; Vasey, Bot. Wheeler Exped., p. 281.—*Scleropelta stolonifera*, Buckley, in herb. Acad. Phil.—Mesas, near Camp Lowell. July.

No. 846 of E. Hall's Texan plants is the same.

F. LAMSON SCRIBNER.

Notes on the Trees of the South-west.*—*Quercus Emoryi*, Torr., known as the "black oak," is very common in the country of the Upper Gila. It never grows on the hills, nor far from the beds of the streams, though these may be dry during the greater portion of the year. It delights in a fine gravelly, or sandy soil in open cañons. Although the growing wood is not subject to decay, as is the case with the other oaks of this section, I do not know that it is highly esteemed. It is here a tree 40 or 50 feet in height, and proportionately stout. Its thick, dark, and glossy foliage would make it a very handsome tree, but for the scraggy appearance given it by its dead twigs and branches. Its acorns furnish the principal September food supply of large flocks of wild pigeons.

Quercus hypoleuca, Engelm.—This handsome little tree I have observed in the Bear Mountains. It scarcely exceeds 15 feet in height, the trunk being stout for the size of the tree. Its long, elegantly pointed, dark green leaves, silvery below, render it handsome in spite of its gnarled and twisted trunk and branches. It grows only in deep cañons, and in the rockiest places. It would be a great favorite as an ornamental tree in those sections where it could be successfully cultivated.

Quercus undulata, Torr., grows sparingly in the Bear and Burro Mountains, and very abundantly in the Mogollon Mountains, where, with the sycamore, it forms about five-sixths of the tree-flora of the cañons. The young wood is quite tough and strong; but, as it grows older, it soon becomes brittle and subject to decay. The trunks and main branches, like those of *Platanus*, are much twisted, and bent or arched. It grows only in the bottom of the cañons.*

Quercus grisea, Liebm.—This is comparatively a rare tree in the sections which I have visited. A few trees grow in the San Francisco Mountains, and it is rather frequent in the Bear Mountains. Its smaller leaved forms approach the next species in appearance, but it seems to be distinguished from that by its more abrupt manner of taking on fresh foliage; while in the color and appearance of its bark, and the habit of the tree, it is much like *Q. hypoleuca*. I did not see the fruit.

Quercus pungens, Liebm.—I am somewhat in doubt as to whether the plants which I have called by this name do not constitute two species, one a good-sized tree, the other shrubby. This tree, if we include its shrubby forms, is probably more abundant than any other in the basin of the Upper Gila, and the adjacent country. It does not grow upon the plains, but is everywhere abundant in the mountains. It clothes many of the gravelly hills, from base to summit, with a dense thicket of scraggy growth. On the higher summits it is not common, while in partial shades in the cañons and near water, it becomes a good-sized, though rather low tree. Its form is strikingly like that of a well-grown apple-tree; and a gentle slope, or grassy hollow dotted with good-sized, scattered specimens reminds one strongly of a New England orchard, and is a sight which a lover

*Continued from page 53. In making up the April number of the BULLETIN, Mr. Rusby's name was accidentally omitted from his communication, and the omission was overlooked by us till it was too late to rectify the error.—Ed.

of fine trees delights to look upon. Probably no tree is more generally unsound at the heart, yet one must be experienced to detect the indications of such a state. It is difficult to find a sound specimen, except where the roots have access to a permanent water-supply, and then only among young trees.

Alnus oblongifolia, Torr.—With the exception of the Coniferae, this occasionally becomes the largest tree of the South-western Rocky Mountain region, though the average size is less than that of the next. It is common and abundant along nearly all mountain streams, growing only at the very edge of the water. It is well-proportioned and handsome. The wood is brittle, decays rapidly, and is fit only for firewood.

Populus Fremontii, var. (?) *Wislizeni*.—A magnificent tree, abundant along all streams in the open country, or in the open parts of the cañons. Toward the heads of the cañons, or where they are narrow and precipitous, it is rarely found. Like other cottonwoods, this species flourishes where no others grow, and is hence one of the most valuable trees.

Juniperus occidentalis, Hook., var. *monosperma*, Engelm.—One of the most abundant trees of Southern New Mexico, growing occasionally in cañons, but mostly on low hills with the next, and with *Pinus edulis*, these three species constituting almost the entire tree-flora of the hilly country. It becomes something more than a "small tree," though it is never tall. In some sections it is almost the only tree.

Juniperus pachyphloea, Torr.—Everywhere abundant in the mountains and hills. The large, sweet fruit is extensively eaten by bears and coyotes, and, I believe, by foxes (!) and deer.

Cupressus Arizona, E. L. Greene.—This fine tree I have seen only in the San Francisco Mountains, where it is quite abundant, growing both in cañons and upon the highest mountains, on the northern slopes. Where it grows in thick patches, it becomes tall and straight, much resembling, at a distance, the balsam fir. Single specimens branch widely, and assume handsome forms. The largest that I have seen measured about forty inches in diameter. It possesses great value as a timber-tree, being evidently adapted to varying conditions of soil and climate, the wood being light, strong, straight-grained, and apparently durable. Its handsome form and color, and the sprightly disposition of its foliage would render it a favorite upon the lawn. Growing upon so limited an area, in a lively mining district, where great numbers of the trees are being continually cut for fuel, both as wood and charcoal, it is not sufficiently protected, and it is strongly advisable to introduce it into other sections.

Pseudotsuga Douglasii, Carr.—The principal species constituting the large and dense forests which clothe the higher portions of the Mogollon Mountains. In the deep and shady cañons it descends almost to the base of the mountains, the largest specimens growing in such locations. Unless two species have been observed, two distinct forms grow here, one with the very glaucous leaves shorter and more rigid and crowded. The bark of the latter is thicker, and is more deeply furrowed than in any other species with which I am acquainted.

Pinus reflexa, Engelm.—Seen only in the higher portions of the Mogollon Mountains, where it grows sparingly. The trunk is tall, slender, crooked, and very flexible, with a few branches at the top. The large, somewhat flattened seeds are fully as sweet and rich as those of *Pinus edulis*.

Picea Engelmanni, Engelm., grows sparingly in the Mogollon Mountains, and only on the highest summits. It forms a compact and handsome top.

Ephedra antisiphilitica, C. A. Meyer, becomes a small tree of 12 or 15 feet in height, and 5 or 6 inches in diameter, along the Rio Grande. It is apparently worthless.

HENRY H. RUSBY.

Contributions toward a List of the State and Local Floras of the United States.

III. THE SOUTH-EASTERN STATES.

Manual of Botany adapted to the productions of the Southern States.

By John Darby, A.M. (D.)

12mo., 612 pp. Macon, Ga., 1841, and New York, 1866.

Musci Alleghanienses, sive spicelegia Muscorum atque Hepaticarum quas in itinere a Marylandia usque ad Georgiam per tractus montium, A. D., 1843, decerpserunt Asa Gray et W. S. Sullivant. By W. S. Sullivant. (C.)

12mo., 87 pp. Columbus, Ohio, 1846.

Flora of the Southern United States, containing abridged descriptions of the flowering Plants and Ferns of Tennessee, North and South Carolina, Georgia, Alabama, Mississippi and Florida. By A. W. Chapman, M.D. (D.)

8vo., 621 pp. New York, 1860.

Enumeration of the species issued in the first and second centuries of Ravenel's "Fungi Caroliniani Exsiccati," with other species collected at the same time in insufficient quantities for distribution. By M. C. Cooke. (C.)

In Grevillea, Vols. vi and vii. London, 1877-'79.

VIRGINIA.

Flora Virginica, exhibens Plantas quas v. c. Johannes Clayton observavit atque collegit. Eisdem methodo sexuali disposuit, ad genera propria retulit, nominibus specificis insignivit minus cognitatis descripsit Joh. Fred. Gronovius. (D.)

8vo., pp. 206. Leyden, 1739-1743.

Catalogue of Plants observed by John Bannister in Virginia. (A.)

In Ray's *Historia Plantarum*, Vol. ii. London, 1688.

WEST VIRGINIA.

Flora of West Virginia. By H. N. Mertz and G. Guttenberg. (A.)

List of Timber Trees of West Virginia. By J. H. Diss Debar. (B.)

In *Handbook of West Virginia*.

Forest Trees, Shrubs and medicinal Plants of West Virginia. By W. M. Fontaine. (B.)

In *Resources of West Virginia*, p. 111. Wheeling, 1876.

List of medicinal Plants growing in West Virginia. By Dr. A. S. Todd. (A.)

In *Trans. Med. Soc'y of W. Va.*, for 1867 and 1871.

NORTH CAROLINA.

Catalogue of the indigenous and naturalized Plants of the State. By M. A. Curtis. (B.)

In Geol. and Nat. Hist. Survey of N. C., Part iii. Raleigh, 1867.

Synopsis Fungorum Carolinae Superioris. By L. D. De Schweinitz. (C.)

In Acta Soc. Nat. Cur. Lips. Leipzig, 1822.

List of Trees of North Carolina. (B.)

In Report on Forestry, pp. 471-477. Washington, 1879.

Report on the woody Plants of North Carolina. By M. A. Curtis.

In Geol. and Nat. Hist. Survey of N. C. 1860.

Jones County.

Catalogue of Plants observed in the neighborhood of Newbern. By

H. B. Croom and H. Loomis, M.D. (A.)

8vo., pamphlet, pp. 52. Newbern, 1883.

Catalogue of the Plants, native or naturalized, in the vicinity of Newbern. By H. B. Croom. (A.)

8vo. pamphlet, pp. 52. New York, 1837.

New Hanover County.

Enumeration of Plants growing spontaneously around Wilmington N. C. By M. A. Curtis. (A.)

In Journ. Bost. Soc. Nat. Hist., Vol. i. 1834.

SOUTH CAROLINA.

Sketch of the Botany of South Carolina and Georgia. By Stephen Elliott. (D.)

2 vols., 8vo., pp. 606 and 744. Charleston, 1817-1824.

Notes on the Marine Algae of South Carolina and Florida. By J. Cosmo Melvill. (C.)

In Trimen's Jour. Botany, Vol. iv. (new series), p. 258. London, 1875.

Flora Caroliniana. By Thomas Walter. (D.)

8vo., pp. 263. London, 1787.

Charleston County.

Catalogue of phaenogamous Plants and Ferns, native or naturalized, found growing in the vicinity of Charleston. By J. Bachman. (A.)

Pamphlet, pp. 15. Charleston, 1834.

Catalogue of the Natural Orders of Plants inhabiting the vicinity of the Santee-Canal, S. C., as represented by Genera and Species.

By H. W. Ravenel. (A.)

In Proc. Am. Assoc. Adv. Sci., Vol. iii. 1850.

A Medico-Botanical Catalogue of the Plants and Ferns of St. John's Berkly, S. C. By F. P. Porcher. (B.)

8vo., pamphlet, pp. 54. Charleston, 1847.

Richland County.

Catalogue of the Plants of Columbia and its vicinity. By Lewis R. Gibbes.

Pamphlet. Columbia, 1835.

GEORGIA.

Cherokee County.

A List of Plants found in the neighborhood of COUNASAGA River, where Spring Place is now situated. By Mrs. Gambold. (A.)

In Amer. Journ. Sci. and Arts., 1 series, Vol. i. 1818.

FLORIDA.

A Catalogue of a Collection of Plants made in East Florida during the months of October and November, 1821, by A. Ware. By Thomas Nuttall. (C.)

In Am. Journ. Sci. and Arts., 1 series, Vol. v. 1822.

List of the Plants growing spontaneously in the vicinity of Quincy, Fla. By A. W. Chapman, M.D. (A.)

In Western Journ. Med. and Surg., Vol. iii. (new series), 23 pp. Louisville, Ky., 1845.

List of the Marine Algae collected by Dr. Edward Palmer on the coast of Florida and at Nassau, Bahama Islands, March-August, 1874. By D. C. Eaton. (B.)

8vo., pamphlet, pp. 6. New Haven, 1875.

An enumeration of some Plants, chiefly from the semi-tropical regions of Florida, which are either new, or which have not hitherto been recorded as belonging to the Flora of the Southern States. By A. W. Chapman, M.D. (D.)

In Bot. Gazette, Vol. iii. Logansport, 1878.

Ferns of South Florida. (With notes on the species.) By A. P. Garber.

In Bot. Gazette, Vol. iii. Logansport, 1878.

W. R. G.

N. L. B.

The brittle Branches of *Salix sericea*, Marshall.—Has any one examined critically the "brittleness at the base" of the branches in this willow, of which our text-books tell us? It seems phenomenal, though akin to the articulation we find in *Ampelopsis*, *Taxodium*, *Thuja* and some others at the fall of the year. Here is a branch so tough that we may use it like twine, and which separates as easily, by a light tug, as we pull a feather from a bird! It is not really "brittle at the base," for the base must mean either exactly at the junction with the parent stem, or some indefinite point above. But the point of separation is a little above the true "base," and always just at this point, barely a hair's breadth in width; and the breakage is always in a true circle around the stem. It is evidently not a species of "brittleness" so much as a case of specific, incipient articulation.

THOMAS MEEHAN.

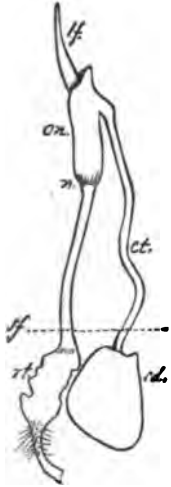
A Suggestion.—Errors in the description of plants occur here and there in our Manuals of Botany, owing for the most part, no doubt, to the tendency of some species to vary from the typical form. But it is surprising that there should be so great a discrepancy in the diagnosis of *Carex Novae-Angliae* and *C. Emmonsii* so far as the color of their spikelets is concerned. Both Wood and Gray state that the former has purplish spikelets and the latter green ones; whereas the reverse seems to be the rule. Out of a large number of specimens of *C. Novae-Angliae* received from the mountains of New York, Vermont, New Hampshire and Massachusetts not one so much as suggests a purplish spikelet. On the other hand, *C. Emmonsii* always shows scales more or less purplish. Admitting

that the persistent style of the former is sufficient to distinguish it from the jointed style of the latter, is there not still good ground for suggesting a change in the description of these two species?

Yonkers, N. Y.

E. C. HOWE.

Germination of *Iris versicolor*.—The accompanying figure illustrates a peculiar mode of germination that I have observed this spring in *Iris versicolor*, the seeds of which I had planted in a flower-pot kept in a rather warm place in the house. The descriptions and figures of the germinating seed of *Iris* which I have seen thus far (cf. Gray, Structural Botany, p. 24, fig. 55) do not agree with my observations, for I do not find mentioned and illustrated in them the long, filamentous connective (*ct*) between the endosperm of the seed (*sd*) and what I must call the cotyledon (*cn*).



The whole process reminds one very much of the germination of *Phoenix dactylifera* (Sachs's Botany, Eng. edit., 1875, p. 542, fig. 388), but in the case of the *Iris* the connective is much longer in proportion, and rises, with the first node (*n*), and the first leaf (*lf*), from one-half to three-fourths of an inch above the surface (*sf*), while the seed (*sd*) stays behind under ground.

It would be worth while to ascertain whether this mode of germination is common with *Iris versicolor*, or whether, as I suppose, it is abnormal—caused perhaps by the more rapid growth at a higher temperature.

Hoboken, N. J., April, 1882.

JOSEPH SCHRENK.

New Station for *Corema Conradii*, Torr.—Learning that *Corema Conradii*, Torr, had been found on Shawangunk Mountain, Ulster Co., N. Y., I went there on the 2d of May to seek it. I found it growing on the crest of the ridge, in a bleak spot not sheltered by trees; quite plentiful there, but not seen elsewhere, for the two miles that I looked for it.

It is a low bush, much branched, spreading, almost prostrate, with erect branches, about 9 inches high, and 20 inches wide across the branches, from out to out.

It is described as dioecious or polygamous. I got 85 specimens, of which were dioecious, 84; monoecious, 1; polygamous, 0.

The monoecious specimen had 30 clusters of pistillate flowers near the top, and one cluster of staminate near the base: total clusters on the specimen or branch, 31. I saw no other flower in bloom, on the mountain. I found a small form of *Asplenium montanum*, Willd., from one to one and a half inches high.

The day was cold, with a high wind and heavy squalls of snow and rain. In some sheltered places, last winter's ice was not all gone. The height of the ridge is about 1,800 feet above tide-water. It was too early for the regular spring flowers in so elevated and exposed a place. I was under the impression that the plant was

strictly dioecious, and therefore did not look for polygamous or monoecious plants. The collection of one of the latter, was purely accidental, and was not observed until I got home. A more careful examination on the spot, may show that monoecious and polygamous forms are more common than I found them.

216 So. 15th Street, Philadelphia.

CHARLES E. SMITH.

Notes from Massachusetts.—During the present spring I have examined a large number of the plants of *Symplocarpus foetidus*, Salisb., with a view to observing malformations, with the following result. More than a dozen spathes were found which contained a second spathe within the outer one. Their relative positions varied. In some specimens the inner spathe opened in the same direction as the outer, in others it faced directly opposite, and in others it occupied intermediate positions between these. Each specimen contained a perfect spadix. All the spathes in one cluster (8) presented this change. Several specimens were found which were perfectly normal with the exception that the spadix was abortive, very minute and imperfect. One had no trace whatever of a spadix. Incidentally it was noted that the flowers were much frequented by our common honey-bees. Indeed, with one or two accidental exceptions, I have noticed no other insects about them.

Prof. Bailey's observation on the lack of male flowers in the alders this spring finds abundant confirmation in this locality. The peculiar season seems to have worked confusion among our spring flowers. The rare *Nardosmia palmata*, Hook., found at a single station in this region, has this season almost wholly failed to put forth flowers. Not half a dozen specimens have been collected where usually hundreds are found, although quantities of the palmate leaves testify to the vitality of the roots.

Amherst, Mass., May 5th, 1882.

WINTHROP E. STONE.

The Alder Catkins.—On page 57 of the BULLETIN I see a note on alder catkins, and would like to say that the staminate catkins of that plant, in this vicinity, this year, were remarkably vigorous, and appeared in great profusion. I noticed this fact from my attention, for special reasons, having been given to them. I should reasonably expect there might be all this difference in places so distant from each other as Rhode Island and Wisconsin.

Ripon, Wisc.

C. T. TRALEY.

Plant Exchanges.—Dr. Joseph V. Haberer, of 66 Miller Street, Utica, N. Y., who is constantly engaged in collecting, and who has good specimens of everything found growing in Oneida County and vicinity, desires to correspond and exchange with botanists devoted to the study of *Carex*. Dr. Haberer's list of desiderata is too long to insert in this place, but may be obtained by addressing him as above.

Mr. Gustav Adolf Zwanziger, the editor of the *Kärntner Gartenbauzeitung*, and whose address is Klagenfurt, Kärnten, Austria, writes us that he would like to exchange phaenogams and cryptogams of the Austrian Alps for American ferns, mosses, algae and phaenogams.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. IX.]

New York, July, 1882.

[No. 7.]

William Henry Leggett.

The decease of the late Editor of the BULLETIN calls for more than the passing notice which it has received in its columns. Mr. Leggett was born February 24th, 1816, and died on the morning of the 11th of April, 1882. Always a hard student, he graduated from Columbia College in 1837. Previous to that event he had already devoted himself to teaching—a calling which he pursued throughout life. By means of the kindness of his disposition he endeared himself to his pupils and led them on to regard the pursuit of knowledge as a pleasure instead of a task, and to aim at the attainments in classical knowledge which he himself possessed.

The following extract from a letter of one of his former pupils fitly illustrates the thoroughness which he always endeavored to instil into the minds of those committed to his charge: "How many there are of us all over the country who took from him our first lessons in accurate scholarship!"

He early became enamored with the study of botany, and the same feeling of thoroughness in his investigations of plant life exhibited itself in this as in his other studies. He was one of the founders of the Torrey Botanical Club, whose resolutions passed on the event of his decease express their sense of his scientific attainments and of his efficiency as a leader and co-laborer with them. His labors as the first Editor of the BULLETIN which was started by him as a private enterprise in 1870, and conducted as such until the year 1880, can, perhaps, only be fully appreciated by those who have had to perform similar work in the midst of other pressing duties. Day by day, following his occupation as an instructor with conscientious fidelity, he yet found time, too often taken from hours of needed rest, to write, collate and arrange for the press the matter of his journal. His success in the performance of his work was complete, but the harassing nature of his daily duties, and his failing strength finally compelled the relinquishment of its charge to other hands.

His private character was above reproach. Upright, conscientious and fearless, he was prompt to denounce wrong in every shape; yet was always considerate and charitable towards the shortcomings of others. In his social relations, his purity of character, his self-sacrificing spirit, his integrity and kindness of disposition endeared him to all.

The following extracts from letters written by those who had enjoyed his society for years show the cordial esteem in which they held him. One says: "I can hardly call to mind a single man that I have known with whom all my intercourse was so sweet and delightful as with him; * * * he was so sincere and guileless, so cheerful and bright." From another: "My botanical tramps with

him always had a classic seasoning—Greek as well as Botany—which made them doubly enjoyable; while his genial charity toward all men was a pattern and delight." And from one other: "We had been friends for more than forty years * * * a more pure-minded and true-hearted man I have never known. * * * The world has lost in him a profound classical scholar, a most conscientious teacher, and an enthusiastic botanist."

We shall close this brief biographical notice with one more extract from a letter of this old friend, touching in its sadness: "Our dear departed friend has left an aching void in the hearts of all who knew him, so kindly disposed and sincere in his affections he was, while gifted with extraordinary powers of promoting innocent mirth and true sociality. One cannot expect to meet with many such in a lifetime. Would he had been spared to us many years longer. I little thought I should outlive him."

T. H.

A New Species of *Dichromena*.

By S. H. WRIGHT.

DICHROMENA REVERCHONI.—Culm nearly terete, smooth, slender, caespitose, four to nine inches high; leaves very narrow, smooth, acute, almost capillary, those of the culm $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long; radical leaves 2 to 5 inches long, erect or falcate and spreading; involucre of two slender, unequal, acute bracts, dilated and whitened at the base, the longer being about 1 inch in length, and the shorter from $\frac{1}{4}$ to $\frac{1}{2}$ inch long; spikes 4 to 6, and $\frac{1}{2}$ to $\frac{1}{4}$ inch long, terminal, sessile, glomerate, scales variable, acute, obtuse, truncate, or even emarginate in the same spike, and *keeled, white*, with more or less ferruginous lines at the base when mature; achenia dull, strongly rugose, round-obovate, very convex, the dilated base of the short-beaked, compressed tubercle, decurrent on both edges to and around the base of the nut, giving it an annulated appearance there.

This species was discovered in 1879, and in one place only, by Mr. Julien Reverchon in a little swamp watered by a spring in limestone rocks, near Turtle Creek, Dallas County, Texas, and near Dallas. It flowered in June. Specimens collected in 1880, in flower only, were sent to me. A very few in fruit, collected in 1881, were obtained, from which the above description is given.

A List of Grasses collected by Mr. C. G. Pringle in Arizona and California, with descriptions of those species not already described in American Publications.*

20. *Hilaria rigida*. (*Pleuraphis rigida*, Thurber, Gram. Mex. Bound. ined.; Bot. Cal., ii., p. 293.)—Yuma, Arizona. June 25.

See note under "Change of Name" in March number of the BULLETIN.

21. *Imperata caudata*, Trin., Sl., t. 70, f. 1; Griseb., Flor. Br. W. Ind., p. 561; *Imperata arundinacea*, Vasey, in Bot. Wheeler Exped., p. 296.

Culms erect, terete, smooth, clothed at the base with numerous

* Continued from page 77.

dry and distichous sheaths, 3 feet and more high; leaves, excepting the upper ones, which are short (1-2 inches), very long (1 foot and more) flat, rather stiff or rigid, 4-6 lines wide, above much narrower, and more or less conduplicate below, margin with a narrow, minutely serrulate, cartilaginous line, apex long-acuminate, with a sharp, stiff point; ligule short, long pilose. Panicle (in specimens in hand) 6-8 inches long, narrow ($\frac{1}{2}$ -1 inch), very woolly, and densely flowered; lower branches erect, $1\frac{1}{2}$ inch long. Spikelets in pairs (single above), the pedicel of one about one line long, that of the other one-half shorter, densely pilose at the base with long (3-4 lines) silvery-white, silky hairs, with similar hairs on the outer surface of the empty glumes. Empty glumes sub-equal, the upper and larger one $1\frac{1}{2}$ -2 lines long, both 5- or imperfectly 7-nerved, with broad, obtuse, erose or finely ciliate tips, and enclosing three hyaline scales appearing like lodicules; the outer one, which is supposed to represent a neutral floret without a palea, is lanceolate, obtuse and finely cut at the tip, nearly as long as the empty glumes; the second, supposed to be the fertile glume (lower palet), is like the first, excepting that it is a third smaller; the third scale, supposed to be the palea of the perfect flower, is about $\frac{2}{3}$ of a line long and fully as broad, irregularly and deeply cut-toothed at the tip (sometimes almost regularly 3-5 toothed). This scale surrounds the ovary and the one stamen.

By streams, Santa Catalina Mts. June. It is the same as No. 283 of Drummond's Texas coll. (vid. herb. Philada. Acad.)

22. **Heteropogon contortus*, R. & S., Syst., ii., 836.

= *H. hirsutus*, Pers., Syn., ii., 533.

= *Andropogon contortus*, L. Vasey, in Bot. Wheeler Exped., p. 296.

Santa Cruz Valley, near Tucson. (459.)

23. **Heteropogon contortus*, R. & S., var.—Differs from the last only in having the outer glume of the male flower smooth (not at all pilose), and with but a very narrow-winged, scarious margin. It agrees with descriptions of *Heteropogon Alionii*, R. & S. (*H. glabrum*, Pers.), but it seems too near *H. contortus* to be separated from it.

Mesas, near the Santa Rita Mts., Arizona. (460.)

24. **Andropogon Jamesii*, Torr., in Marcy's Rep. (1852.)

= *A. glaucum*, Torr., in Ann. N. Y. Lyc., i., p. 153 (1824.)

= *A. Torreyanus*, Steud., Syn. Gram., p. 392 (1854.)

Santa Cruz Valley, near Tucson. (453.)

Equals No. 845 of E. Hall's Texan Plants; No. 3,635* Curtiss's Distrib. N. Am. Pl.; and No. 582 of Brandegee, collected near Cañon City, Colorado, referred to *A. argenteus*, Ell., in Flor. Colorado. This grass is very closely allied to *A. saccharoides*, Sw. (vid. Griseb., Flor. Br. W. Ind.), and perhaps should be united with it.

25. **Phalaris intermedia*, Bosc., in Poir. Encycl. Suppl., i., 300; Chapman's Flora of the Southern States, p. 569.

Santa Cruz Valley, near Tucson. May.

26. **Aristida Americana*, L., Am. Acad., v., 393.

= *A. dispersa*, var., Trin. & Rupr.

= *A. bromoides*, HBK. Thurber, Bot. Cal., ii., p. 298.

Mesas, near Camp Lowell. (470.)

A very variable species, of which there are two forms in the collection; one with upright culms about 7 inches high, with the branches of the panicle short and erect; the other with more or less geniculate culms, 18 inches high, with the panicle more open (the lower branches being from 2-3 inches long and more or less spreading) resembling in habit *A. caerulescens*, Desf. The first form is the more common in collections from the West, and is that described by Dr. Thurber in Bot. Cal., ii., p. 289, under the name of *A. bromoides*, HBK. The different forms of this species, of which the *A. bromoides*, HBK., is one, were all united by Trinius & Ruprecht under their *A. dispersa*. Genl. Munro, in his catalogue of the grasses in the herbarium of Linnaeus, says that *Aristida Americana*, L., from Jamaica, "is called *A. dispersa* by Trinius; but Linnaeus's name ought to take precedence. Kunth has misplaced the Linnæan synonym in *Eutriana juncifolia*." Grisebach, in Flora of the British West Indies, unites *A. Americana*, L., *A. dispersa*, Trin., *A. bromoides*, *humilis* and *coarctata*, HBK., and *A. cognata*, Trin., under *A. stricta*, Michaux.

27. **Aristida Humboldtiana*, Trin. & Rupr., Stipac., p. 118; Vasey, Bot. Wheeler Exped., p. 286; *A. divaricata*, HBK.

Mesas, near Camp Lowell. June.

28. *Stipa occidentalis* (?) Thurber, Bot. Wilkes's Exped., p. 483; Bot. Cal., ii., p. 285.

Mt. Shasta, California; alt. 7,000 feet. August. Pringle's specimens differ from the description of this species in Bot. Calif., and from specimens in herb., in their more slender and wiry habit, extremely short ligule, both empty glumes 3-nerved, smaller, shorter and less hairy flowering glume, and the proportionately shorter pale. It seems to be a form intermediate between *S. occidentalis* and *S. Sibirica*, Lam. It differs from the latter species in its narrow leaves, and more plumose and twice geniculate awn. It appears to be nearer *S. occidentalis*, and may be, as Dr. Vasey suggests, a depauperate form of that species.

29. *Muhlenbergia comata*, Benth. *Vaseya comata*, Thurb., Proc. Phil. Acad., 1863, p. 79; Bot. Cal., ii., p. 278.

Mt. Shasta, California; alt. 6,000 feet. August.

30. *Muhlenbergia Texana*, Thurber, Gram. Mex. Bound., ined.; Porter and Coulter, Synop. Flor. Col., p. 144.

Mesas and foot-hills, near Tucson.

31. *Muhlenbergia distichophylla*, Kth., Enum. Pl. i., p. 202; Vasey, in Bot. Wheeler's Exped., p. 283; *Podosaemum distichophyllum*, Presl., in Rel. Haenk., i., 231.

Cañons, Santa Catalina Mts. May.

32. **Muhlenbergia virescens*, Trin., Unifl., 193; Kunth, Enum., Pl. i., 202., et Suppl., 160; *Podosaemum virescens*, HBK., Nov. Gen., i., 132; *Trichochloa virescens*, R. & S., Syst., ii., 389.

Culms slender, 2 feet high, simple or branched at the base, smooth. Leaves narrow and involute, the upper about one foot long, nearly equalling or slightly exceeding the culm. Ligule 6 lines long. Panicle 6 inches long, the erect branches single, or the lower

in pairs, densely flowered nearly or quite to the base. Empty glumes lanceolate, pale straw-colored and sometimes tinged with purple, the upper 3-nerved, mucronate and often 3-toothed at the tip, $2\frac{1}{2}$ lines long, one-half a line longer than the acute, one-nerved lower glume. Flowering glume 2 lines long, pilose below on the back, and for nearly $\frac{3}{4}$ its length on the margins, terminating in a slender awn 6–10 lines long; palea nearly as long as its glume and similarly pilose. Stamens $1\frac{1}{2}$ line long, pale purple.

This species resembles *M. gracilis*, Trin., in habit, but is distinguished at once by its very long involute leaves and light colored, more loosely flowered panicle.

Summits of the Santa Rita Mts., Arizona.

This is a Mexican grass, not before observed in the distributed collections made within the limits of the United States, and perhaps now found for the first time within our limits. It should be added that identification of Pringle's specimens with *M. virescens*, Trin., is based upon descriptions of that plant only.

33. **Muhlenbergia debilis*, Trin., Agrost., ii., 49; Thurber, Bot. Cal., ii., p. 277; *M. purpurea*, Nutt., Pl., 180.

Foot-hills, Santa Catalina Mts. April.

34. *Muhlenbergia sylvatica*, Torr., var. *Pringlii* (vel n. sp.)—Culms densely caespitose, terete, erect, simple, rather rigid, about 1 foot high. Leaves involute, filiform, about 7 to each culm, minutely scabrous outside, especially towards the tip, strigose scabrous within, 4–6 inches long, the lower ones shorter; ligule broader than the leaves, decurrent along the sheath, $\frac{1}{2}$ line long, irregularly cut, continued on each side into two lanceolate, acute teeth or auricles one line long. Panicle slender, contracted, 2–3 inches long, rather densely flowered. Empty glumes nearly equal, 1-nerved, with slender acuminate points, 1 line long. Flowering glume nearly or quite smooth at the base, 3-nerved, scabrous on the keel above, $1\frac{1}{2}$ –2 lines long, terminating in a slender awn 4–6 lines long; palea nearly equalling its glume.

Dry Cliffs, Santa Rita Mts.; alt. 7,000 feet. July. (480.)

The specimens are not mature, but are developed sufficiently to show the above-enumerated character. Later, the panicle, the base of which is enclosed in the upper sheaths, may become exserted, and the culms, though now strictly simple, may become branched. It is referred to *M. sylvatica* because of the resemblance of the panicle and minute characters of the spikelets to that species. It is distinct from No. 731 of C. Wright's Texan coll., called *M. monticola* by Buckley, and referred to *M. sylvatica* by Munro.

Girard College, Philadelphia.

F. LAMSON SCRIBNER.

The Brittle Branches of Salix were recently referred to by Mr. Thomas Meehan. Ordinary wood-cells are long, and possess tapering extremities which overlap each other. This overlapping occurs all along the wood, about as much in one place as in another. In brittle willows the cells mostly end abruptly at the place where the branch snaps off. At first thought, this might seem to be a defect in the structure of the plant. Notwithstanding this peculiarity, such

trees produce branches enough. The wind, weight of snow or other forces frequently bring down the young branches. The trees mostly grow in moist soil, frequently near streams. These branches may take root in the soil where they drop, or be carried down stream by the current and lodge on the shore below. With this view, the brittleness is a very effectual means of multiplying and distributing the species. Analogous examples are not uncommon. The fleshy buds in the axil of the leaves of the tiger-lily separate spontaneously and produce independent plants where they fall in suitable places. *Sempervivum globiferum* produces some slender branches a foot or more in length, and these bear a couple of small thick leaves at the end, within which are rudiments of other leaves. These leafy tips spontaneously separate and produce new plants where they strike soil. If my memory is not at fault, the slender branch then dies, as is the case with the runner of a strawberry after it produces a new plant at the end. Doubtless many similar examples are familiar to most botanists and horticulturists.

Michigan Agricult. College, Lansing.

W. J. BEAL.

Brittle Branches of Salices.—In the June number of the BULLETIN Mr. Thomas Meehan has opened a subject of considerable interest. Several of the willows (especially old trees) beside *Salix sericea* have branches brittle at the base, or rather which semi-articulate above their true base. This I have noticed for years in *S. sericea* and in *S. Babylonica*, but supposed it was a case of true brittleness as set forth in our manuals.

E. C. HOWE.

Dicentra Canadensis.—Since I wrote the note on *Dicentra Cucullaria* for the April number of the BULLETIN, I have had occasion to examine the "tubers" (as they are called in our manuals) of *D. Canadensis*, and have found that they, too, are simply very much enlarged petiole-bases. There are also some very minute, abortive leaves formed at the base of the fully developed leaves, but they do not grow into small bulblets as in *D. Cucullaria*, and therefore this species has no bulb-like rootstock; but the large, round bulblets are scattered singly on the more or less elongated, thin, scaly rhizoma. On the top of each, the scar left when the upper portion of the leaf has withered away, is plainly visible.

Hoboken, May, 1882.

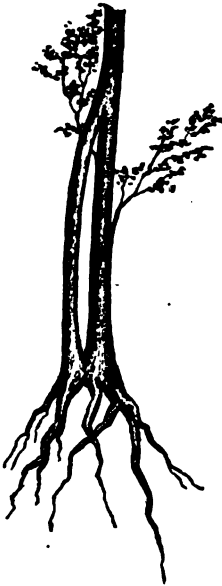
JOS. SCHRENK.

Multiplication of Spadices in Arisaema.—I have to report a monstrosity quite new in my experience. In my small garden, I have growing a number of wild plants, among them *Arisaema triphyllum* in quantity. The "pulpit" of one of these is occupied by two "preachers." To speak after the manner of botanists, there are within the spathe two spadices, confluent only in the lower flower-producing part. The flowers are all pistillate and apparently normal. Of the two "Jacks," one is taller than his clerical brother, while the lesser one is deformed, that is, somewhat flattened below and dilated above. He has a somewhat subdued look beside his more arrogant

brother. Dr. Masters mentions cases of double *spathes* in *Arum maculatum*, but I have seen no record of multiplication of the *spadices* in that or any related plant.

W. W. BAILEY.

Adhesion between two Beeches.—In the case represented in the annexed cut, reproduced from a drawing sent to the BULLETIN by Mr. Arthur Hollick, Nature appears to have executed a species of grafting, akin to that which, in the operations of gardening, is known as "inarching." The figure represents two small trees of *Fagus ferruginea*, Ait., the axes of which, through very close contact, at about five feet above the surface of the soil, have adhered at that point until a perfect union has taken place and the two individuals have become inseparably blended together there into one trunk. The fusion once effected, all traces of the union have become thoroughly effaced through subsequent annual growth. As will be observed, adhesion has also occurred at the bases of the trees.



Examples of this nature are perhaps not quite as frequent as the occasionally figured ones where two contiguous trees of the same species have become united through the cohesion of their branches, the axes preserving their individuality above such point of union.

Those who have taken the trip by stage-coach, from the steamboat landing at the foot of Lake George to Fort Ticonderoga, have perhaps had pointed out to them by the driver at a certain point on the route, an instance of a still more singular sort of adhesion, where two trees of *different* genera—an oak and an elm—are so closely and firmly adherent for about three feet above the ground-line as to form but a single trunk, which is apparently covered by a continuous bark.

The specimen here brought to the reader's attention by Mr. Hollick was detected by Mr. G. M. Wilber, near Pleasant Plains, Staten Island, on the occasion of a field meeting of the Torrey Club; and, after having been hewn down by the only implements available—pocket knives and a geological hammer—was transported with some difficulty to the museum of the Staten Island Natural History Society.

Fern Notes.—Permit me to add to Mr. Davenport's Fern Notes, page 71, May number of the BULLETIN, that *Botrychium nudicaule*, L. f., is quite common from Temecula Canon (north of San Diego) to All Saints' Bay in Lower California. I have gathered many specimens of it in various places. It grows on dry ground, usually wherever *Dodecatheon* or *Selaginella* does. The plant is very inconspicuous, and usually springs up and vanishes in less than six weeks.

I also have to add that *Gymnogramme triangularis* has just been gathered by me at Empire City, Nevada, growing along with *Wood-sia Oregana* and *Cheilanthes myriophylla*.

Salt Lake City, U. T.

MARCUS E. JONES.

Dimorphous Flowers of Menyanthes.—The usual form of *Menyanthes trifoliata* here has the stamens about half the length of the projecting style. In 1872, I found a specimen with short style and long stamens. I have looked for it since in the same locality and elsewhere, but have not succeeded in finding it again. Will some one who has collected the plant say whether both forms are common?

St. Stephen, N. B., June, 1882.

J. VROOM.

Note on Tricardia.—I have recently gathered at Empire City, Nevada, Mr. Watson's *Tricardia Watsoni*, Torr. Mr. Watson, I believe, found a single specimen at St. George, Utah, and Mr. Parish found one on the Mojave. I was fortunate enough to secure about six specimens of this extremely rare plant. These nine specimens are, I believe, the only ones known.

MARCUS E. JONES.

Botanical Notes.—*Origin of the name Bonpland.*—The *Pharmaceutical Journal* says: "Mrs. Mulhall, in 'Between the Amazons and Andes,' gives a curious account of the origin of the name of the celebrated botanist, Bonpland. Visiting the house of one of his friends at Corrientes, she came across a manuscript in Bonpland's writing, which begins:—'I was born at Rochelle on August 29, 1773. My real name was Amadé Goryand. My father—a physician—intended me for the same profession. It was on account of my great love for plants that he gave me the sobriquet of Bon-plant, which I afterwards adopted instead of my family name.'"

On the Drying of certain Plants.—The difficulty of drying plants belonging to the natural orders *Crassulaceae* and *Orchidaceae*, and some of those belonging to the *Portulacaceae* is well known, and the knowledge of a remedy to prevent the plants from growing in the drying-paper will doubtless be welcome to those who are preparing herbaria. M. C. Lallemand (*Bull. Soc. Bot.*, p. 192) recommends enclosing the plant to be dried for twelve hours in a wide-mouthed bottle or iron box, and submitting it to the vapor of benzine contained in a small vessel enclosed with it. The plant is thus killed, and the drying takes place rapidly when the plant is pressed in botanical drying-paper.

The Mayflower.—The *Magazine of American History*, in two of its recent numbers, has included among its various archaeological and historical notes one pertaining to botany. In the April number, a correspondent makes inquiry as to the origin of the name "Mayflower" as applied to *Epigaea repens*, and in the succeeding number Dr. O. R. Willis has undertaken to give the desired information. We remember that two or three years ago this same question was discussed by various writers, through the columns of the *New England Journal of Education*, some of these taking the ground that the name

was derived from that of the vessel which carried the Pilgrim Fathers hitherward, and others connecting it with the name of the month which the plant bears.

The *Epigaea*, by the way, is known in North Carolina as "crocus." This being the case it is pertinent to inquire what the *Crocus* is called in that State.

The Progress of Botany.—The recently distributed Annual Report of the Board of Regents of the Smithsonian Institution for the year 1880 contains a paper by Prof. W. G. Farlow on the Progress of Botany in 1879 and in 1880. This paper, with similar ones on the progress made in the departments of Astronomy, Geology, Physics, etc., during the same years, forms a continuation of the Annual Record of Science and Industry formerly published by the Messrs. Harper Bros., but discontinued with the volume for 1878.

A forgotten Evolutionist.—In a paper published in the *Archives des Sciences Physiques et Naturelles*, and reproduced in the *Revue Scientifique* of May 27th, the distinguished botanist, M. Alph. De Candolle, gives us, along with a very just estimate of the scientific labors of the late Charles R. Darwin, some pleasant reminiscences of his long personal acquaintance with that naturalist.

M. De Candolle reminds us in this paper of an evolutionist, now completely forgotten, whose name and work he made known to Mr. Darwin on the occasion of a visit which he paid the latter in 1880. This old author was Duchesne, whose Natural History of Strawberries was published in 1766, thus antedating by many years those later writings of Lamarck, which have caused that naturalist to be regarded as the foremost modern originator of the theory of the variation of species. Duchesne, says M. De Candolle, "was a horticulturist and professor of natural history; and his instruction was as varied as solid." The following is the observation of his which is sometimes cited without remarking the originality of the consequences that he deduced from it. Having sown some seeds of the wild wood-strawberry that he had collected about Versailles, he saw, to his great surprise, that the majority of the plants obtained had but a single leaflet instead of the three which usually characterize the leaves of the species. He sowed the seeds of these singular individuals, and they produced the same form, which has since been preserved. Botanists name this new strawberry *Fragaria monophylla*. Duchesne started from this fact, and from others that he had observed, to reason very profoundly on new forms more or less hereditary, and on what may be called species, race or variety. He reckons that many forms designated as species are races, whose origin may be ascertained, or at least presumed, and he lets drop from his pen words that are truly extraordinary for the epoch. Thus, in speaking of the classification of species, genera and families, he says: 'A genealogical order is the only one that Nature indicates, the only one that satisfies the mind; every other is arbitrary and void of ideas.' He even ventures to give a genealogical tree for the strawberry, constructed from such pedigrees as he knew or presumed. This is what ultra-Darwinians are doing at the present day, with the difference that Duchesne had ascertained one of the pedigrees, while they suppose them all from hy-

pothetical views and more or less disputable reasonings. No one paid any attention to the ideas put forth by Duchesne, and to such a point that a conscientious biographer, who pronounced his eulogy in a public assemblage, omitted them entirely."

Botanical Literature.

British Fresh-Water Algae, exclusive of the Desmidiaceae and Diatomaceae. With colored Plates. By M. C. Cooke, LL.D. London : Williams & Norgate. 1882.

Since the publication, in 1852, of Hassall's History of the British Fresh-Water Algae, a work now classed among rare books, and one seldom obtainable, we believe that no other on this subject has appeared in the English language, if we except Dr. Wood's incomplete monograph, which was published by the Smithsonian Institution in 1872.

All students of these plants, then, both English and American, will welcome the Manual which Dr. Cooke is compiling and publishing under the above title. The first part of the work, which has just reached us, is devoted to the *Palmellaceae*, and consists of twenty-eight octavo pages of descriptions in English, with copious notes and observations, accompanied with eleven excellently colored plates. The second part, which is now in course of preparation, will include the *Protococcaceae* and *Volvocineae*, and this will soon be followed by a third part devoted to the *Zygnemaceae*. The author estimates that it will require about twelve parts to complete the work, and these will be furnished at prices varying with the size. Judging from the comparatively low price of the part before us, the cost of the entire work will prove quite moderate, even at the advertised price ; yet Dr. Cooke offers the inducement of a discount of 25 per cent. from the latter to those who subscribe now, each part to be paid for as published.

Flora of Westchester County (N. Y.). By Oliver R. Willis, A.M., Ph. D., 8vo., pamph., pp. 56. New York : Roper & Burdge.

During the half century that has elapsed since the publication by the late Dr. S. B. Mead, in the Reports of the Regents of the University for 1831-'32, of a list of plants found growing in the vicinity of North Salem Academy, nothing has been added to our knowledge of the flora of Westchester County, excepting an occasional note in the BULLETIN ; and no one had examined the entire region with a view to making a complete report until Dr. Willis was induced to do so by the Rev. Robert Bolton, the author of the History of Westchester County. It was for this work that the Catalogue was especially prepared, and from this that the reprint before us was taken.

According to the author, there have been detected in the County, up to the present time, 1,142 phaenogams and 46 ferns and their allies. Of the phaenogams, 50 are trees reaching a height of 30 feet and beyond ; 34 are trees attaining a height 15 to 30 feet ; and 69 are shrubs, all of which are growing without cultivation, and very few of which have been introduced. Of the entire number of plants

enumerated, 88 are adventive from Europe; and, of these, 57 are found growing without cultivation, and are said to be naturalized, while the remaining 31, although growing without cultivation, can scarcely be regarded as fully established. There is a large number of typographical errors scattered through the pages of this flora, due, as we are informed by the author, to the fact that he was not given a proper opportunity to correct proof. These, however, since the publication of the pamphlet, have been corrected, and a list of the corrections has been printed in the form of an appendix; but we regret to see that even the latter is not free from error, the conceit of the compositor having led him to make a supposed correction of the author's "yellow water-crowfoot" to "yellow-water crowfoot."

A preliminary Catalogue of the flowering Plants and higher Cryptogams growing without Cultivation within thirty miles of Hanover, N. H. By Henry G. Jesup, A.M., Professor of Natural History in the Chandler Scientific Department of Dartmouth College, and the N. H. College of Agriculture and the Mechanic Arts. 8vo., pamph., pp. 52. Hanover, N. H.: N. A. McClary. 1882.

From a typographical point of view, this catalogue presents a marked contrast with the one just noticed, the paper being of excellent quality, and the letter-press of nearly faultless execution.

Prof. Jesup's work is intended to include, so far as known, the flora within about thirty miles radius of the town of Hanover, N. H., a circuit extending to, and embracing the mountain peaks, Moosilauke and Kearsarge in New Hampshire, and Killington in Vermont. The limit embraced is divided nearly equally between the two adjoining States. The total number of plants enumerated is 1,008, of which 956 are phaenogams and 52 are cryptogams. Of the latter, 7 are *Equisetaceae*; 36 (excluding varieties, 6) are *Filices*; and 10 (excluding variety, 1) are *Lycopodiaceae*. The number of introduced phaenogams is 144. The number of additional plants that may be expected to occur within the limits embraced in the flora, and a list of which is given in an appendix, is 146.

As the primary object of this catalogue was the benefit of the author's classes in botany, and of the public at large, brief directions have been given for the collection and preservation of plants; and common names have been added so far as known. The latter differ in no case from those found in all our manuals.

To the catalogue of plants is appended a 22-page list of the vertebrate animals found within the same limits.

The Thirteenth Annual Report of the American Museum of Natural History, Central Park, New York, Feb., 1882. 8vo., pamph., pp. 28.

Of botanical interest in this Report is the following statement: "An herbarium of North American plants, preserved with remarkable taste and care, has been received from the late Stephen Whitney Phoenix, and forms the beginning of a new Department of special interest to those scientists devoting themselves to the study of botany." As well known to those who have visited this Museum, the Economic Department contains a very large and interesting col-

lection of native and foreign woods. This collection has been so greatly increased during the last year by the labors of a corps of experienced botanists under the direction of Prof. C. S. Sargent, that it has been found necessary to transfer the specimens temporarily to the Arsenal building in Central Park, where they will be displayed to the public during the coming autumn.

Proceedings of the Torrey Club.—At the regular meeting of the Club held at Columbia College, Tuesday Evening, April 11th, the President occupied the Chair, and twenty-two members were present.

After the reading of the minutes the President announced the death of Mr. W. H. Leggett, and remarked at some length upon his life, character and attainments. Judge Brown and Mr. Gerard were appointed a Committee to draft resolutions proper to the occasion.

Plants Exhibited.—Mr. Chamberlin exhibited a collection of marine algae gathered in New York Harbor, and, with it, a number of different forms of a species of *Grinnellia*. The President showed the floating-bladder of a species of *Macrocystis* from California and gave an account of the plant which bore it. Mr. Schrenk exhibited a specimen, preserved in fluid, of a seedling *Iris*, showing a peculiar mode of germination.

Preservation of Specimens of Coniferae.—Mr. Schrenk stated that, after an unsuccessful trial of many expedients for the preservation of specimens of Coniferae for the herbarium, he had found that by soaking the specimen in Wickersheimer's preservative fluid it was rendered flexible, and no longer showed a tendency to shed its leaves after being pressed and mounted.

One corresponding and two active members were elected.

At the regular meeting held Tuesday evening, May 9th, the President occupied the Chair and twenty-three persons were present. Resolutions expressive of the Club's respect for the late Mr. Leggett, and of its sympathy with his relatives in their bereavement, were read and adopted, and a draft of the same was directed to be transmitted to the family.

The Herbarium.—The Chairman of the Herbarium Committee announced the receipt of a gift to the Club's herbarium, from Mr. Geo. E. Davenport, of a collection of Alaskan ferns.

Plants Exhibited.—Mr. Braman exhibited a small collection of fresh specimens of plants sent from Wisconsin by Mrs. C. T. Tracy, comprising the following species: *Anemone patens*, L., var. *Nuttalliana*, Gray; *Isopyrum biternatum*, T. & G.; *Trillium grandiflorum*, Salisb.; and *Erythronium albidum*, Nutt. Mr. Schrenk showed a seedling *Iris* growing in a flower-pot, and exhibiting the same peculiarities in its mode of germination as the preserved specimen exhibited by him at the last meeting. The President exhibited the leaves of a number of species of *Platanus* and remarked upon the manner in which, in the West, the seeds of *P. occidentalis* are disseminated in the spring.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. IX.]

New York, August, 1882,

[No. 8.]

A New North American Rose.

By C. C. PARRY.

On a recent botanical excursion in the upper part of Lower California, between the 5th and 15th of April of the present year (1882), among other interesting discoveries in that little-known district, a remarkable new species of *Rosa* was met with, which, on account of its peculiar botanical and horticultural features, seems deserving of an early notice.

It was first seen in riding along a well-travelled road, skirting the shores of All Saints' Bay, between Sanyal and Encenada, about the parallel of 32° N. latitude, becoming abundant, and forming dense low thickets on dry slopes shut off from the sea-breezes, and composed of crumbling ferruginous sandstone. Forming, as it did, a most conspicuous and agreeable feature in the arid landscape, with its finely divided foliage and showy pink or white flowers, it attracted the attention of all the members of the party, which included Messrs. C. G. Pringle, C. R. Orcutt, M. E. Jones and the writer, by all of whom full collections were made.

Specimens were shortly afterward sent to Dr. Engelmann, of St. Louis, who, at the request of three of the discoverers, Mr. Pringle, Mr. Orcutt and myself, has kindly furnished the following diagnosis and description, from which the readers of the BULLETIN can form a clear idea of its peculiar botanical characteristics :

ROSA MINUTIFOLIA, *n. sp.*—A much-branched shrub, 2–4 feet high; shoots pubescent, densely covered with straight or slightly recurved, red-brown, bristly, at first pubescent spines, their leaves with broad, divaricately auricled stipules, and mostly 5 leaflets; fertile branches bearing numerous terete, subulate spines, some of the shorter and more persistent ones often in pairs under the branchlets; leaves fasciculated on short spurs, narrow stipules divaricately auricled, leaflets minute (only 1–2 lines long, the lowest pairs the smallest) oval, simply incised-dentate, pubescent, not glandular; flowers single, $\frac{3}{4}$ –1 inch wide, on tomentose, bractless peduncles from between the leaves; calyx-tube globular, densely setose-hispid, a thick nectariferous ring contracting its opening; petals suborbicular, scarcely emarginate, deep rose-purple or white; central ovules borne on short styles; styles distinct, short, woolly.

Described from specimens sent by Dr. C. C. Parry and M. E. Jones. A most striking and lovely species, distinguished from all other roses by its minute, deeply incised leaflets. The young shoots have larger, distant leaves, with fewer, but larger leaflets, the terminal one the largest, sometimes 4 or 5 lines long; fragrance faint. This species is quite peculiar among its American congeners, and even among the roses of the Old World, so that it is difficult to determine its true position. In aspect and habit it comes nearest to the

Pimpinellifoliae on account of its single bractless flowers, its numerous acicular spines, and its small leaves; but it recedes in its pinnatifid calyx-lobes.—*G. Engelmann.*

New Species of North American Fungi.

By J. B. ELLIS.

VOLUTELLA DIAPHANA.—Punctiform, minute, white, substipitate, marginal hairs few, straight, hyaline, septate below and united by a membrane, which forms a receptacle filled with the oblong-elliptical, hyaline, 1-2-nucleate spores, .0002' long.

Very near *V. Hyacinthorum*, Berk., but apparently distinct.

On decaying leaves of *Orontium aquaticum*. October.

HELICOSPORIUM MICROSCOPICUM.—Tufted, minute, scarcely visible without a lens. Tufts cinereous-brown, consisting of a prostrate, subhyaline, branching hypha, with erect, faintly septate branches bearing lateral, closely coiled, .0005' in diameter, 12-20-septate, pale brownish spores of about two coils.

The manner of growth seems to be as follows: The tip of the young erect thread coils upon itself and forms a spore, after which the same thread pushes its growth still further, but in a direction a little inclined to that of its former growth, when the tip coils again in a direction opposite to that of the first coil, forming a second spore. Whether this manner of growth is continued further I have not observed.

The spores or conidia soon fall away, and the thread that bore them becomes erect and straight. The mature spores are slightly constricted at the septa.

On decaying staminate catkins of *Alnus serrulata*, lying on the ground in damp thickets. June.

ISARIOPSIS GRAYIANA.—Appearing like a thin, tufted, brown pubescence. Tufts .005' high, composed of numerous, rather slender (.0001' in diameter), closely septate, subnodulose threads, more or less abruptly bent above, and bearing at their tips the small, .0002'—.0003', oblong-elliptical, simple or uniseptate spores.

Occasionally, some of these spores become more elongated and 2-3-septate.

On old canes of *Rubus villosus*, lying on the ground. West Chester, Pa.

ZYGODESMUS RUDIS.—Hypha coarse, showing only here and there the zygo-desmoid joints; spores, or conidia, subglobose, strongly but rather sparingly echinulate, about .0003' in diameter.

Forming a thin, light ferruginous stratum on the under side of a charred cedar log. Found also on decaying *Rhus venenata*.

VAISA DIDYMOSPORA.—Perithecia 6 to 10, globose, .013' in diameter, circinating on the surface of the inner bark, and circumscribed by a black line which penetrates the wood, but not deeply; ostiola cylindrical, about equal in length to the diameter of the perithecia, converging with their tips united and bent upwards, piercing the epidermis, which is only slightly elevated; asci clavate-cylindrical, small, .001'—.0012' x .00015'; sporidia minute, .000125'

long by half as wide, composed of two globose cells united into an oblong spore.

When the epidermis is peeled off, the perithecia generally adhere to its inner surface.

On dead limbs of *Ilex opaca*. March.

VALSA CERCOPHORA.—Perithecia few, 4 to 6, rather large, imbedded in a subcarbonaceous stroma, which is circumscribed by a black line penetrating the wood; ostiola stout, obtuse, with a large opening, united into a subconical disk, which pierces the epidermis and rises slightly above it; asci clavate-cylindrical, .003'-.0033'x.0004'-.00045'; sporidia biseriate, oblong-elliptical, constricted in the middle and appendiculate at each end, .0004'-.0006'x.00015'-.000175', hyaline, with several small nuclei.

The appendages, which are finally absorbed, are as long as, or longer than the spore itself, and the upper one is generally recurved at its extremity. The limbs on which this species grows are not so much decayed as those on which the preceding species is found, being still sound and tough.

On dead limbs of *Ilex opaca*. March.

VALSA FARINOSA.—Stroma cortical; perithecia few (2 to 4,) pale, .013' in diameter, raising the bark into little prominences, which indicate their position; disk tuberculiform, yellowish white, of a loose granular or mealy substance; ostiola large, pale horn-color, ovate or conic, at length disappearing and leaving a large opening; asci clavate-cylindrical, obtuse; paraphyses indistinct; sporidia 1- or 2-seriate, acutely elliptical, subhyaline, with a large central nucleus, about .0006'x.0002'.

Very variable with regard to the ostiola, which are often entirely wanting. Some of the stromata contain perithecia filled with brown, appendiculate stylospores of about the same size and shape as the ascospores, and which appear referable to Dr. Cooke's genus *Harknessia*.

Fern Notes. V.

By GEO. E. DAVENPORT.

Notholaena tenera, Gillies.—This rare fern, which Dr. Parry found so unexpectedly in Utah, in 1874, has again turned up, but this time in the San Bernardino Mountains of California, where it was discovered in May last by the Parish Brothers, who write that it was found "growing very sparingly in two neighboring cañons at an altitude of perhaps 5,000 feet. In both places it grew in crevices of precipitous limestone cliffs, which were quite dry at the time of our visit, and do not seem to be ever really wet. In one cañon there was a single specimen, and in the other some twenty or more, but most of them dry, and the others, as you see, in poor condition."

The specimens which I have received are clearly identical with the Utah plant, and differ but little from Parry's or Palmer's specimens.

It has already been recorded (*Ferns of North America*, Vol. i., p. 337) that some doubts exist in regard to the correct identity of the Utah plant, but the figure in *Botanical Magazine* (Vol. lviii., plate

3,055), where the species was originally described by Hooker under Gillies's manuscript name, from plants cultivated from spores, may, it seems to me, be fairly taken to represent our plant, only in a larger form, otherwise the characters are the same. Lowe's figure (Vol. i., pl. xv.) also appears to have been taken from cultivated plants, from which due allowances are to be made for plants in a state of nature. Kunze's figures I have not seen.

Lygodium palmatum in New Hampshire.—Mr. Wm. H. Bates, of St. Paul's School, Concord, N. H., wrote me in April last that he had found a single frond of last year's growth of this species growing in a low meadow half a mile from the school. The frond measured about seven inches in length, and had seven pairs of sterile pinnae. Mr. Bates states that Prof. Hitchcock, in his Geology of New Hampshire, credits *Lygodium* to Hudson, N. H., but I have no knowledge of its presence in that State authenticated by actual specimens.

It is to be hoped that Mr. Bates will be fortunate enough to find later a sufficient number of specimens to establish its presence there beyond a doubt.

Asplenium Filix-foemina, Bernh.—Mr. Bates has sent me a small doubly-crested frond of this species, taken from a plant found by him last summer in a rocky meadow near the school, and answering very well to *Athyrium Filix-foemina*, var. *crispum*, Moore. This form is sometimes met with in cultivation, but there is no good reason why such forms should not occur here occasionally in a state of nature as well as in England where they are not uncommon, and Mr. Bates has not been able to find any evidence of his plant having escaped from cultivation.

Botrychium simplex, Hitchcock.—Mrs. M. J. Myers sends some fine, robust specimens of this species which were collected near Ithaca, N. Y., by Prof. W. R. Dudley. Two of the specimens approach the ternate form, and two have the stipes unusually developed so that the lamina appears as if placed above the middle, as in Milde's var. *fallax*.

From Miss Furbish, I have just received specimens of *B. simplex* collected by her in Rangeley, Maine, making still another station for this species.

Abnormal Growths in Botrychia.—Mrs. Myers has also sent me for examination a weakly developed specimen of *B. Lunaria*, which has two fertile branches, the second, and extra branch springing from the stipes just below the first, and a portion of the sterile segments bearing from one to four sporangia. The specimen, with a younger one, was collected in Cicero Swamp, near Syracuse, by Prof. Dudley.

From Strong, Maine, comes a large specimen of *B. lanceolatum*, collected by Miss Furbish, with the lamina nearly transformed into a fertile panicle. The specimen is further interesting in showing the two portions of the bud standing nearly upright, and with only a very slight inclination towards the thickened stipes over which they would have reclined later in the season.

Osmunda Claytoniana, L.—Mr. F. W. Morandi has collected in Malden, Mass., some interesting specimens of this species in which

the fertile pinnae retain nearly the appearance of the sterile, and bear a marginal fructification. Some of the pinnae are only very slightly contracted, and, showing the green surface of the lamina between the marginal lines of sori beneath, as well as on the upper side, have an elegant appearance. In some of the specimens the fructification is carried upward on to the normally sterile pinnae; in one instance, to within three pairs from the top, and in another, with four pairs of fertile pinnae which show the green tissue between the lines of sporangia, the fructification is carried up on one side only, nearly to the top. Examining the venation in such portions, I found that, whereas in the wholly sterile segments the veins forked once or twice with great regularity, extending from a nearly straight costa to the entire margins, in the fertile segments the margins were more or less toothed, and either a single vein projected from the more eccentric costa into each notch or sinus, and bore on its slightly thickened, or obsoletely forked apex a sorus, or, in the broader segments, that the veins forked once, the branches terminating in the notches of the doubly-serrated margin and bearing on their apices the much reduced sori.

Osmunda cinnamomea, L.—Mr. Storow Higginson once pointed out to me a distinctive character, which, so far as my observations have since extended, appears to be quite constant in this species, and may serve to aid those who are sometimes puzzled to distinguish between its sterile fronds and those of its congener *O. Claytoniana*. In *O. cinnamomea* there will be found at the base of each pinna a small persistent bunch of wool which is nearly or wholly wanting in *O. Claytoniana*, and of which no mention has been made anywhere that I am aware of.

***Helonias bullata* on Staten Island.**—While botanizing near Rossville, S. I., in the early part of April with Mr. Arthur Hollick, my attention was drawn to numerous specimens of a plant having a tuft of parallel-veined leaves at its base, which had apparently remained green all winter. We at once suspected that it might prove to be *Helonias*, as we knew of nothing else resembling the plant in question native to this part of the country. Deeming the discovery of sufficient importance to warrant further investigation, we made another trip to the locality on the 28th of May, and were rewarded by finding a single flowering specimen, almost gone, to be sure, but showing plainly that our first surmise was correct.

The locality is about three-fourths of a mile south of Rossville, a short distance west of the road leading from that place to Kreissher-ville. It is in a maple swamp near a clay bed.

Many other pine barren plants grow in the vicinity, notably *Ascyrum Crux-Andreeae*, L., *Euphorbia Ipecacuanhae*, L., and *Aster concolor*, L. I have already referred to the remarkable manner in which the pine barren flora extends into Staten Island (see BULLETIN, Vol. vii., p. 81), and the discovery of *Helonias* there adds another species to my list, and a new one to the flora of New York State.

June 20, 1882.

N. L. BRITTON.

Teratological Notes.—On a small single *Fuchsia* (*F. fulgens*, var.) that I have been watching, so large a percentage of the flowers (considerably over one-half) are monstrous, and the forms produced are so different that it may be worth while to record those that were noticed, though cases similar to several of them are already on record. They will be readily understood from the diagrams annexed, which represent plans of the flowers above the calyx-tubes.

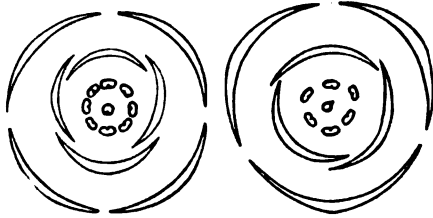


Fig. 1.

Fig. 2.

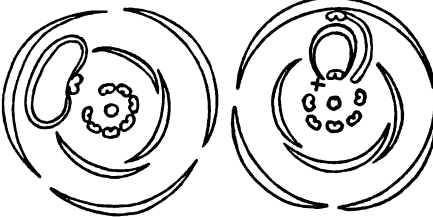


Fig. 3.

Fig. 4.



Fig. 5.

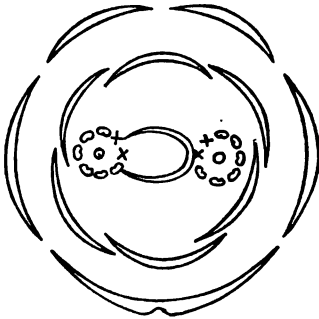


Fig. 6.

Besides the normal tetramerous flower (Fig. 1), several were noticed that were trimerous throughout (Fig. 2). In one flower, otherwise normal, a stamen adhered by the whole length of its filament to the middle of the calyx-lobe before which it stood, and on which it thus came to form a wide-topped crest, its anther being free and poliniferous. One flower (Fig. 3) was normal excepting that two contiguous segments of the calyx were united, and so reduced in size that this organ appeared regularly trilobed, while the petal opposite the line of union had its edges somewhat involute and fused with the filament before it, so as to form a horn-like organ something like the spur of an *Aquilegia*. Two calyx-lobes of another flower (Fig. 4) were adherent throughout until anthesis, when they tore apart irregularly for about one-half the distance from tip to base. The stamen opposite one of them was entirely wanting; that before the other was free from its insertion up to the anther, which was joined by a small

part of one edge to the middle line of the double calyx-segment. The other parts were normal. Finally, two flowers (Fig. 6) were joined from the bases of their peduncles to the top of the calyx-tubes. The adjacent sepals of each, on one side, were united. One calyx-segment and two stamens were suppressed on the united sides, and the ovary of each was three-celled through the imperfect development of the corresponding septa (Fig 5). In several of these forms the aestivation was considerably disturbed.

Flowers of the sea-onion (*Urginea Scilla*) not infrequently show meiophylly, either of the whole flower, when there are five divisions of the perianth, five stamens and two carpels, or of the gynoeceum only, when there are but two carpels, the other parts being in double whorls of three each.

Madison, Wisc.

WILLIAM TRELEASE.

A List of Grasses collected by Mr. C. G. Pringle in Arizona and California, with descriptions of those species not already described in American Publications.*

35. **Sporobolus cryptandrus* (Torr.) Gray, var. *stricta*.—A robust form, nearly 4 feet high, with an erect, densely flowered, narrow, wand-like panicle (18–20 inches long), the lower portion enclosed in the inflated sheath of the upper leaf. The panicle is remarkably light colored.

Banks of the Rillita, near Camp Lowell. June. This grass represents one extreme form of the species, the other extreme being represented by the var. *flexuosa*, Thurber.

36. **Sporobolus Wrightii*, Munro, MS.—Culm stout, erect from a creeping root-stock, leafy, branched at base; sheaths smooth, pilose at the throat, longer than the internodes; ligule a narrow, ciliate ring; leaves smooth without, scabrous within, 2–3 lines wide below, tapering into a very long, filiform, scabrous tip, upper leaf nearly a foot long; panicle lanceolate, base enclosed in the upper sheath, 12 inches or more long, branches very numerous, more or less spreading, 2–3 inches long, flower-bearing for nearly their entire length; spikelets a line long; empty glumes unequal, very thin, the lower nerveless, a third shorter than the very faintly one-nerved upper one; flowering glume obtuse, similar in texture to the empty ones; palea as long as its glume.

This is a robust species, with stout, leafy culms, a long, handsome panicle, with numerous slender racemous branches; spikelets grayish or lead-colored.

Near Pantano, Arizona. June.

The determination of Pringle's specimens was made by comparison with specimens in herb. Acad. Phila., collected at Camp No. 12 on the Little Colorado, Oct. 6, 1851. Mr. G. R. Vasey collected the same in New Mexico last season.

37. **Sporobolus asperifolius*, Thurber, Bot. Cal., ii., p. 1,269; *Vilfa asperifolia*, Nees & Meyen, in Trin. Agrost., i., 73; *Sporobolus arenaceus*, Buckley, in Proc. Phila. Acad., 1862, p. 89.

Santa Cruz Valley, near Tucson. June.

38. *Sporobolus gracillimus*. *Vilfa gracillima*, Thurber, Bot. Cal., ii., p. 268; *V. depauperata*, var. *filiformis*, Thurb., MS.; Watson, Bot. King's Exped., p. 376.

Mountains about the head-waters of the Sacramento River, California. August. (136.)

39. *Sporobolus depauperatus* (?). *Vilfa depauperata*, Torr., in Hook, Flor. Bor. Am., ii., p. 257; *Vilfa utilis*, Torr., Pacif. R. R. v., p. 365.

* Continued from p. 89.

Panicle $\frac{1}{2}$ –1 inch long, simple or shortly branched below, empty glumes $\frac{1}{2}$, nearly 1 line long, ovate-acute or lanceolate-accuminate and mucronate or shortly awn-pointed; floret linear with a distinct, hairy callus, $1\frac{1}{4}$ line long, terminating in a slender awn, 1–3 lines long; palea acute, equalling its glume; grain linear, nearly a line long

Rocky cañons, Santa Catalina Mts., alt. 5,000 feet. May.

The general appearance of this grass, and especially the character of the spikelets is so like that of *Muhlenbergia* that it is referred to *Sporobolus depauperatus* with considerable doubt. The culm is nearly 3 feet long, very firm and hard below, very much branched above, forming a long mass of slender branches with filiform, divergent, thread-like leaves.

This is probably the same form as that collected at Tejon Pass by Mr. Blake, which Dr. Thurber (Bot. Cal., ii., p. 268) describes as "a tangled mass of long, flexuose, filiform and very tough culms." Dr. Thurber adds that this appears to be the form assumed by the plant in the southern localities, where it is much sought after by the Mexicans, who use it for stuffing their large leathern *aparejos*, or pack-saddles, a purpose to which its toughness and elasticity especially adapt it. It was this use of it which led Dr. Torrey to give the name *V. utilis*.

Pringle's specimens agree in habit with those of Lindheimer's Texan collection (1846), but the spikelets are different, having, as stated above, the characters of a *Muhlenbergia* (calling to mind those of *M. sylvatica*); yet, there is so much variation in the minute characters of those in the same panicle that it suggests an abnormal development. It is unlike any *Muhlenbergia* before observed, and is referred to Dr. Torrey's *Vilfa utilis* because of its resemblance in habit to descriptions of that grass, and to Lindheimer's specimens.

40. *Sporobolus ramulosus*, Kth., En. Pl., i., 215; Thurber, Bot. Cal., ii., p. 269; *Vilfa ramulosa*, HBK., Nov. Gen., i. 137, t. 684; Watson, Bot. King's Exped., p. 376; *Agrostis minutissima*, Steud., Syn. Gram., 171.

By streams, Santa Catalina Mts. May.

41. *Agrostis arachnoides*, Ell., Bot. Carol., 134; Chapman, Flor. S. States, p. 551.

Near Camp Lowell, Arizona.

42. **Agrostis exarata*, Trin. Watson, Bot. King's Exped., p. 377; Thurber, Bot. Cal., ii., p. 273.

There are two forms; No. 466, from the banks of the Rillita, May, and No. 468, with a more slender panicle, gathered by brooks of the Santa Rita Mts. in July.

43. *Agrostis varians*, Trin., Agrost., ii., 68; Thurber, Bot. Cal., ii., p. 273.

Mountains about the head-waters of the Sacramento River; alt. 8,000 feet. August.

44. **Agrostis verticillata*, Vill., Delph., ii., 74; Trin., Icon., t. 36; Thurber, in Bot. Cal., ii., p. 272.

Banks of the Santa Cruz, near Tucson. May.

45. **Agrostis scabra*, Willd., Sp., i., 370; Gray, Man., 5th ed., p. 611; Thurber, Bot. Cal., ii., p. 274.

By streams of the Santa Catalina Mts. May. Distributed as *Agrostis elata*.

46. *Gastridium australe*, P.B., Agrost., 21, t. 6, f. 6; Thurber, Bot., Cal., ii., p. 275.

Girard College, Philadelphia.

F. LAMSON SCRIBNER.

Notes on the Genus *Sphagnum*.—*Europas och Nord Amerikas Hvitmoosor (Sphagna)* is the title of a monograph on the *Sphagna* or peat-mosses of Europe and North America recently issued by the eminent European bryologist, Prof. S. O. Lindberg. It is in pamphlet form, without illustrations, and the first 38 pages are devoted to an introduction treating of the various portions of the plants, followed by 88 pages containing descriptions of 21 species, to each of which is added a full synonymy. The introduction and foot-notes are in Swedish. I briefly note the following changes in nomenclature, where the names in *italics* have been reduced to synonyms:

S. Austini, Sull., = *S. imbricatum*, Hornsch.

S. cymbifolium, Hedw., = *S. palustre*, L.

S. molluscum, Bruch., = *S. tenellum*, Ehrh.

S. acutifolium, Ehrh., = *S. nemoreum* (Jung.) Scop.

S. macrophyllum, Bernh., var. *Floridanum*, Aust., = *S. cribrosum*, n. sp., Lindbg.

S. mendocinum, S. & L., is referred to *S. cuspidatum*, Ehrh.

Prof. Lindberg has based his diagnosis of the new species, *S. cribrosum*, upon specimens I recently sent him, and which were collected in Florida by the late C. F. Austin. It appears that the typical *S. macrophyllum*, Bernh., was not collected in Florida either by J. D. Smith or C. F. Austin. Specimens recently communicated by J. D. Smith, collected in Eastern Florida and along the Caloosa River, all prove to be *S. cribrosum*, Lindbg. No inflorescence has been detected on any of the specimens thus far collected.

"*Sphagnum cribrosum*, n. sp., Lindb.—Dioicum? inferne vix luridulum, superne argenteo-album, admixta exigua flavedine, nitidissimum. Trunci strata epidermacea 3, hic illic 4, 5 vel 2, non fibrigera, idem superficiale extrinsecus non perforatum. Fasciculi ramorum a ramis 3 vel 4, omnibus divaricatis. Folia trunci sat parva, ovato-triangularia, late truncata, ubique acellulis, mediane a poris ad 8 usque sat magnis, uniserialibus vel in media parte cellulae per paria hic illic positae perforatis, constructa, anguste et intus indefinite hyalino-limbata, integerrima, excepto apice summo brevissime maleque dissoluto. Folio ramorum ad 9 mm. longa et 2.25 mm. lata, non quinquefaria, laxissima, recta et stricta, solum canaliculata, anguste ovato-oblonga, vix acuta, superne lata, apice rotundato-obtusa et cucullata, truncatula, anguste et intus pessime definite limbata, integerrima, excepto apice denticulato, dentibus in plano foliari positae, cellulae inanes, 0.3—0.4 mm. longae et 0.02 mm. latae, poris minutissimis, ut sexies minoribus quam in antecedente, et numerissimis, 40—65 in quaque cellula maxima, intramarginalibus, aequidistantibus in tota cellula, alternatim vel hic illic per paria regulariter biserialibus, in cellulis summis tamen in seriebus 3 vel 4 valde irregularibus positae. Bractae femineae?

Section transversa foliaris, cellulae inanes in marginibus utrisque parum sed aequaliter arcuatae, intus in pariete ubique laevissimae; cellulae chlorophylliferae rectangulari-quadratae vel quadratae, perfecte in medio inter easdem inanes posita et eas omnino separantes, in marginibus utrisque planiusculae vel leniter rotundatae, conformiter parum incrassatae, lumine ejusdem formae et maximo.

Sphagnum macrophyllum, var. *Floridanum*, Aust., in BULLET. TORR. BOT. CLUB, vii., No. 2, p. 15 (1880). Rau & Hervey's Catal. N. Amer. Musci, p. 49 (1880)."

Hab. Florida. C. F. Austin; J. D. Smith.

Bethlehem, Pa.

EUGENE A. RAU.

Notes on the Trees of the South-west.—*Acer grandidentatum*, Nutt.—A few trees of this species, hardly large enough to be called trees, were observed in fruit in July, along streams in the Mogollon Mountains.

Canotia holacantha, Torr., grows sparingly upon hillsides in the San Francisco Mountains. Its wood appears to be useless except as fuel.

Quercus oblongifolia, Torr.—The shrubby form, doubtfully referred on p. 78 to *Q. pungens*, Liebm., belongs here, at least in part.

Populus balsamifera, L., var. *angustifolia*, is occasionally seen along the mountain streams in the higher altitudes.

Pinus edulis, Engelm.—Common throughout; seldom growing to be much more than a foot in diameter. Not observed on the highest mountains. I never found one with perfect seeds, and was informed that few trees ever produced them in the section where I collected.

Pinus ponderosa, Dougl.—This is the species from which most of the lumber used in the South-west is sawed. It contains a large amount of resin, and, for most purposes, is probably inferior to *Cupressus Arizona*, E. L. G., but to no other here found. At an altitude of about 8,000 to 9,000 feet it is the predominant species, giving place above to *Pseudotsuga Douglasii*, Carr., and below to *Pinus edulis* and the *Juniperi*.

HENRY H. RUSBY.

Vincetoxicum nigrum, Moench., I find abundant here, between Highland Falls and the Point; more sparingly in Eagle Valley. I send this note, thinking the plant may not have been recorded.

West Point, N. Y., July 5th.

W. W. BAILEY.

Botanical Notes.—*The Corona or Cup of the Narcissus*.—"What pages on pages have been written about this," says the editor of the *Gardeners' Chronicle* (Dr. Masters). "The fact is, it is a botanist's business to ask questions. When he sees a plant it is his business to interrogate it as best he can; so when he finds a flower presenting any peculiarity of structure like the cup of the *Narcissus*, it is his business, his duty and his pleasure to ask what it is, how it came there, what it means, and what is its use. The answer he gets to his questions depends very much indeed on the way the question is put.

* Continued from page 80.

* * * In the case of the *Narcissus*-cup the answer to the question, what is it? has been sought in various directions, as by comparing the cup with similar conformations in other genera, such as *Pancretium*, or by observing the changes it sometimes exhibits when inclined to be 'sportive.' In *vino veritas*; so when a plant deviates from orthodoxy it very often lets out secrets not discernible at other times. Another mode has been by examining the mode of growth from the very earliest to the adult condition. Prof. Babington has kindly sent us a flower of *Narcissus poeticus* in which, to outward appearance, either one or two stamens have assumed the guise of the cup, or a portion of the cup has taken on itself the appearance of a stamen. Some years ago * * * the writer * * * ventured the opinion that the cup of the *Narcissus* consisted of a series of modified stamens. * * * There were grounds for this belief—there still are. Prof. Babington's flower might at first sight be cited in evidence along with others already recorded; but a more careful examination of the flower in question shows that, in this particular instance, it is not the corona reverting to a staminal appearance, but a dislocated and distinct stamen which is partially grown in union with the corona, and so looks as if it were a portion of the corona itself. The conclusions at which we arrived years ago were assailed by no less a person than Mr. Worthington G. Smith. On looking again at his arguments, after a lapse of years, it seems to us now that, while in matters of detail Mr. Smith was quite wrong, in matters of general principle he was quite right, in his interpretation of the mode of formation of the cup of the *Narcissus*. The ill-advised use of the word 'stipule,' and the false analogies thereupon based, concealed the underlying truth that the organ in question was and is an outgrowth from the flower-tube, and not necessarily either perianth-segment or stamen. In those days we relied upon one or two modes or styles of questioning when others were available, which would have shown, as they have done since, that the real interpretation of the corona of the *Narcissus* is that it is an outgrowth from the perianth-tube—an adaptation probably to facilitate cross-fertilization by insect agency. The cases formerly relied on to prove the staminal nature of the corona are capable of other interpretation, which it would be tedious to give here."

Local Floras.—Mr. Joseph Jackson, Jr., is contributing to the *Worcester Daily Spy* a series of lists of the plants of Worcester Co., Mass., each list including the names of 50 species, and the plants being recorded in the order of their flowering. It is the intention of the Worcester Natural History Society, we believe, to publish a complete flora of the county after sufficient material has been collected.

Mr. William C. Prime, in one of his recent "Lonesome Lake Papers" in the *New York Journal of Commerce*, has given a list of 83 plants (not including trees) found in flower in Franconia Valley (N. H.), and on the sides of the mountains, between May 20th and June 20th. Mr. Prime remarks: "Of course the list is not complete, but it will not be easy to add to it, for our researches were systematic and constant."

Dr. Charles Atwood, of Moravia, N. Y., notifies us by circular

that he is gathering material with a view to publishing a flora of Cayuga County. The co-operation of local botanists is solicited.

Appalachia for June contains a few notes on the flora of the White Mountain region, and the statement is made that *Pinus Banksiana* has been detected on Welch Mountain (lat. $43^{\circ} 55' N.$, long. $71^{\circ} 35' W.$)

The *Pharmacist* (Chicago) begins the publication, in the July number, of a catalogue of plants observed and collected by Dr. F. Brendel in the vicinity of Peoria, Ill., between 1852 and 1877. From a synopsis prefixed to Dr. Brendel's paper, we learn that the list will embrace the names of 874 species of Phaenogams and of 87 Cryptogams.

Botanical Literature.

Our Native Ferns and their Allies, with Synoptical Descriptions of the American Pteridophyta North of Mexico. By Lucien M. Underwood, Ph. D. 2d edition. Bloomington, Ill. 1882.

A little more than a year ago a neat and modest volume made its appearance under the title of "Our Native Ferns," which appears to have met with so much success that the author has disposed of his entire edition and now comes forward with a second, enlarged so as to include the entire *Pteridophyta* of the United States.

That portion devoted to the Ferns remains substantially the same as in the first edition, with only such changes and additions as were necessary to bring the work forward to date and make it complete—a fact which shows how much care the author bestowed upon his book in the first place, and guarantees the trustworthiness of the present edition; but the addition of the remaining vascular cryptogams greatly increases the value of the book, and makes it doubly useful to all who seek to study this class of plants.

The author tells us in his preface that he has spared no pains to make his book thoroughly reliable (a fact of which the book itself furnishes sufficient evidence), and has therefore consulted freely the descriptive works of the highest authorities in order to ensure certainty in his descriptions.

There is no apparent disposition, however, to follow others, unless by so doing his own purposes may be the better carried out, but, on the contrary, the author shows much originality of thought, and independence of judgment in the treatment of his work throughout.

The elementary part is clear, and well calculated to introduce beginners to the study of the plants treated of. The excellent key makes the analysis of the ferns comparatively easy. Of the other plants it is enough to say that their treatment rests upon such authorities as Dr. Engelmann for the *Isoetes*, Spring for the *Lycopodiaceae*, and Milde for the *Equiseta*.

The writer can personally testify to the earnestness and fidelity with which the author has sought to make his work complete, and cordially commends the book to all.

It should be in the hands of all who are especially interested in the vascular Cryptogams of the United States.—G. E. D.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

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[No. 9.]

New Californian Compositae.

By EDWARD LEE GREENE.

PENTACHAETA ALSINOIDES.—Hirsute pubescent, 2-4 inches high, diffusely branched; heads numerous, on filiform peduncles 3-6 lines long, 3-5-flowered; scales of the narrowly turbinate or nearly cylindrical involucre 5 or 6; rays wanting; disk-corollas yellow, filiform, not deeply cleft; akenes fusiform, minutely and, for the genus, very sparingly pubescent; pappus of 3 scabrous bristles equalling the akene in length, or occasionally, in one or more of the akenes, reduced, or nearly obsolete.—*P. exilis*, Gray, var. *discoidea*, Gray. Bot. Cal. i. 305, as to the "very depauperate state about San Francisco" only.

The best specimens of this exceedingly well-marked species were collected by the writer on the Berkeley Hills, May 13, 1882.

The plant differs widely from even the rayless forms of *P. exilis*, in the first place by its diffusely branched and altogether sand-wort-like habit, continuing to branch and flower for weeks after the earliest involucre has matured and shed their akenes.

The akenes themselves are very characteristic, being fusiform and nearly naked, while those of *P. exilis* are obovate, or at most, obovate-oblong, and are always densely white-villous.

HEMIZONIA (HARTMANNIA) LOBBII.—Near *H. Heermanni*, Greene, but much more slender, the flowering branchlets filiform, and the heads consisting of only 3 ray- and 3 disk-flowers; akenes of the ray narrowly obovate-oblong, those of the disk crowned with a pappus of 8-10 linear, chaffy scales.

What is probably the only specimen extant of this uncommonly well-marked species, appears to have been lying for probably thirty years in the herbarium of the late H. G. Bloomer. The sheet to which it is fastened bears this note, in the handwriting of Mr. Bloomer: "*Calycadenia*? No. 323 in Lobb's catalogue is omitted. The plant was probably obtained near Monterey. H. G. B."

Though exactly like *H. Heermanni* in the character of foliage, pubescence, glandulosity, etc., it is very distinct by its extremely few flowered heads, and especially by the pappus of its disk-akenes. It forms an interesting third member of what may be called the *virgata* group of the genus.

HEMIZONIA (EUHEMIZONIA) CLEVELANDI.—A foot or two high, simple or branching, very hirsute below, and more or less glandular above; leaves linear, entire; heads small or middle-sized, racemose, sessile or short-peduncled; scales of the involucre with short tips, their margins not at all enfolded over the inner face of the obovate, rather sharply triangular akenes; rays 6-10, white, deeply 3-lobed; outer series of chaff united into a scarcely toothed cup.

The plant was collected many years since in Lake County, by

Dr. Bolander, and was obtained by the present writer in Napa County, in the autumn of 1874; but its specific character, as distinct from *H. luzulaefolia*, D.C., was first recognized about a year ago on the appearance of specimens freshly collected by Mr. Cleveland at Allen Springs, in Lake County.

In characters of flower and fruit it is so very like *H. luzulaefolia* that I detect no difference save in the manner in which the involucreal scales hold the akenes. In the latter their margins are folded over the inner face of the akene, so that the seeds falling to the ground carry the scales with them; but in *H. Clevelandi* they are in this respect wholly free, and falling, leave the scales still adhering to the receptacle.

The pubescence of the two is, however, very dissimilar, that of the one being appressed villous, and even floccose-woolly, and that of the other quite stiffly and setosely hirsute. *H. Clevelandi* has, moreover, fewer and larger glands. But the most obvious distinction between the two species is one so clear as to call for a modification of the character of the section of the genus to which they belong. I refer to the strictly racemose inflorescence of the new species; that of the other members of the group being uniformly corymbose.

HEMIZONIA (CALYCADENIA) CEPHALOTES.—Stem a foot or more high, simple, or with some assurgent branches from the base; lower portions of stem and branches leafy, with smaller leaves fascicled in the axils; heads densely capitate-crowded at, and near the summit; rays seldom more than one or two in each head, or often wholly wanting, and the disk-flowers as often reduced to three or even two; herbage yielding a pleasant balsamic fragrance.—*Calycadenia cephalotes*, D.C., Prod. v., pp. 695, and Torr. & Gray Fl. ii., p. 401. *Hemizonia multiglandulosa*, Gray, Bot. Cal. i., p. 366 in part.

The study of abundant specimens from all parts of the State, as well as careful observations on living plants, convinces me that this plant well merits specific rank. True *H. multiglandulosa* has an entirely different habit, the whole plant, from base to summit of the stem, being evenly branched, so as to form a contracted panicle, the heads freely scattered at the ends of the numerous branchlets. Its herbage has also a very different, and disagreeable odor.

HEMIZONIA (CALYCADENIA) OPPOSITIFOLIA.—Stem slender, a foot or less in height, simple or with spreading, opposite branches; leaves narrowly linear, all of them opposite; heads in pairs, closely sessile, one in the axil of each leaf, and an odd one at the summit of each branch; rays 3, very deeply 3-cleft, white or rose-color, changing to rose-purple; akenes and pappus much as in *H. cephalotes*; tack-shaped glands very few and small.

Collected near Chico, May 30, 1882, by Dr. C. C. Parry.

The species is near akin to the preceding, but well characterized by the strictly opposite arrangement of the leaves, branches and heads, a character quite new in the genus, and also by the remarkable paucity of glands, these being amber-colored, not black, as in the allied species.

VERBESINA VENOSA.—Shrubby, two feet or more high, the branches stout; leaves scabrous-puberulent, deep green, with coarse

and prominent light-colored veins, ovate or ovate-lanceolate, two inches long, entire or with a pair of coarse teeth, or hastate lobes at base, abruptly tapering into a short, winged petiole; flowering branchlets leafy below, naked above and terminating in a loose corymb; involucre shorter than the disk; rays conspicuous; akenes sparingly villous and bearing a pair of stout, persistent awns of more than their own length.

The specimens lie in the herbarium of the California Academy, marked "Cedros Islands," and were probably brought thence, many years ago, by Dr. Veatch.

MICROSERIS (EUCALAIS) ATTENUATA.—Leaves incisely and deeply pinnatifid, the divisions linear; scapes about a foot high; involucre $\frac{1}{2}$ inch long, and narrow; akenes fusiform, 4–4 $\frac{1}{2}$ lines long, very slender, especially from midway upwards; pappus 4 $\frac{1}{2}$ –5 lines long, the elliptic-lanceolate scale more or less villous, and about one-third the length of the slender, strongly barbellate awn.

Collected by the writer on the 25th of April, 1882, on the grounds of the University of California, at Berkeley, where it grows in great abundance, as also on the hills adjacent. The akenes and pappus are extremely long and slender for the group into which it falls, but it is only as to length that they resemble those of the *Calocalais* section. The plant is a genuine *Eucalais*, a section whose best technical character is one which does not appear to have been recognized by any author, namely, the peculiar convolute aestivation of the pappus-scales. But the adoption of this character would exclude from the group *M. Bigelovii*, which has the imbricated aestivation, though not the habit of *Calocalais*.

Unpublished. New Species of North American Fungi.

By J. B. ELLIS.

VALSA LUTESCENS.—Stroma cortical; perithecia subglobose, 10 to 15, subcircinating, disk at length erumpent, brown, convex, with the short, cylindrical, stout, obtuse, substellate-cleft ostiola ranged round its circumference; asci lanceolate, spore-bearing part .0013' x .00025'; sporidia cylindrical, hyaline, curved, .00025'–.0003' x .0001'.

On dead limbs of *Quercus coccinea*. January. The wood beneath the bark occupied by the fungus is generally stained light yellow. (N. A. F., No. 876.)

VALSA BINOCULATA.—Perithecia 3 to 6, rather large, closely imbedded in a stroma formed of the substance of the inner bark, and circumscribed by a black line which does not, however, penetrate to the wood; ascigerous nucleus white, soft and pasty when fresh; ostiola erumpent through cracks in the epidermis, subglobose, with a large irregular opening; asci clavate-cylindrical, .005'–.006' x .006'–.0007'; paraphyses stout and granular; sporidia uniseriate, broadly elliptical, nearly hyaline, uniseptate and constricted, with a large nucleus in each cell, .0008'–.0009' x .0005'–.00055'.

The ostiola are often entirely concealed so that outwardly there is no trace of the fungus.

On dead trunks of *Magnolia glauca*.

VALSA TUBERCULOSA.—Perithecia 8 to 10, globose, .015' in diameter, buried in a stroma formed of the substance of the bark, which is not discolored, though rendered more compact, and surrounded by a black circumscribing line, which penetrates deeply into the wood; ascigerous nucleus whitish; ostiola short, cylindrical, stout, obtuse, with an irregular opening, united in a little fascicle, which barely pierces the epidermis; asci broadly lanceolate, .003' x .0006'; paraphyses filiform; sporidia biseriata, elliptical, with two large nuclei at first, and with the endochrome finally 2-parted, about .0005' x .0003'.

Sometimes two fascicles of ostiola are erumpent from the same stroma.

On dead branches of *Amelanchier Canadensis*. April.

VALSA VENUSTA.—Perithecia 15 to 20, .01' in diameter, closely packed in a loose cortical stroma, which is circumscribed by a black line penetrating the wood; ostiola cylindrical, rough, slender, slightly swollen above, in length 2-3 times the diameter of the perithecia, at first united in a black, uneven, elongated disk, bursting out through longitudinal fissures in the bark, but which is finally obliterated by the compactly clustered, subobtuse ostiola; asci clavate-cylindrical, .002'—.0025' x .0002'—.00025'; paraphyses linear, nucleate; sporidia 8, cylindrical, hyaline, strongly curved, 3-4-nucleate, with the endochrome at length 3-4-times divided, .00035'—.00045' x .00075'.

On dead branches of *Robinia Pseudacacia*. (N. A. F., No. 875.)

VALSA AMPELOPSIDIS.—Perithecia few, seated on the surface of the wood, without any distinct stroma; ostiola cylindrical, subacute, their tips united in an elliptical plane disk, which bursts out through longitudinal fissures in the bark, but is at length obliterated; asci clavate-cylindrical; sporidia biseriata, elliptical, subacute, hyaline with a large nucleus in the centre or with 2-3 smaller ones, .0007' x .00025'—.0003'.

On dead stems of *Ampelopsis quinquefolia*. (N. A. F., No. 881.)*

The Migration of Weeds—of those which may be called "domesticated plants," following man in his movements—and their occupancy of ground to the exclusion of other plants less hardy and able to stand in the struggle for life, is an interesting feature in geographical distribution. Our numerous railroads, traversing now the entire continent, and ramifying in every direction over the States, with their *through-freight* and *through-passenger* transportation, have become the chief agents in this distribution. This struggle for life on the new ground opened to the combatants is more intense than by the natural process, where the movements are governed by causes slower in operation, and extending over a longer period. Here the combatants, the champions which have won their belt on the fields (to borrow a phrase from the prize-ring), are transported more

* On page 74, line 27, of the BULLETIN the word "leaves" should be inserted after the word "fallen."

The habitat of *Peiza Hainesii* (Vol. viii., page 66) should be changed to read "rich soil among decaying leaves in dry woods."—J. B. E.

quickly, and brought face to face with each other. The effect of this is somewhat of a rotation. The weeds succumb—the stronger prevail. I have observed something of this in the streets and waste-places of Aiken during a period of twenty-five years past.

The principal weeds now—those most predominant, and occupying the waste-places and the untrampled portions of the streets, are *Helenium tenuifolium*, *Helianthemum Canadense*, *Acanthospermum xanthioides* *Lespedeza striata*, all, if we except *Helianthemum Canadense*, introduced plants; the first-named, from beyond the Mississippi, the two last from foreign regions. *Helianthemum* may also be classed as an introduced plant, for it has evidently come in from elsewhere, and only in the past few years has been making much progress.

Helenium tenuifolium is not indigenous to this region. It seems not to have been known by Elliott and our earlier botanists. Dr. Chapman gives its locality as "West Florida and westward"; Torrey and Gray, in *North American Flora*, "in Louisiana, Mississippi and Arkansas." I have seen it in quantity along the Georgia Railroad west of Augusta; abundantly in the neighborhood of Augusta; and in the streets of Aiken it is an "evil weed" occupying acres of ground in dense patches, encroaching upon the sidewalks, and giving the street cleaners extra trouble to keep it within bounds. I have had specimens sent to me from as far east as Sumter County in this State on a line of railroad. It has evidently traveled from beyond the Mississippi along the line of railroads, and is now probably pretty well disseminated over our Atlantic States.

Helianthemum Canadense, in the more light and sterile portions of the streets, occupies patches of several acres, to the exclusion of almost everything else, and is on the increase.

Acanthospermum is a much later importation. It was brought from South America, in wool used by the Augusta factories, about twenty-five years ago. It is abundant all around Augusta and along the line of the Georgia Railroad, running west; was reported in Macon several years ago, and now perhaps still further west; on the S. C. Railroad towards Charleston; on the N. E. Railroad from Charleston northward; and on the Augusta, Columbia and Wilmington Railroad in the eastern section of our State. Here, in Aiken, it is generally diffused through the town, all over the streets, in yards and in the gardens, and also extends out into the country around. It is an annual, seeding abundantly; and the small seeds, armed with hooked barbs, help to carry it to long distances.

Lespedeza striata, an importation from Japan, has been here for a longer period. I found it in small quantity, some forty years ago, in the coast region about forty miles north of Charleston; also along the State road within ten miles of the city. Elliott and the earlier botanists make no mention of it. MacBride, who aided Elliott in his "Sketches," and who lived in the very region where I first found it, and knew the flora very accurately, had never seen it. It was probably introduced through the port of Charleston by vessels from the East Indies early in the present century, and began to spread

itself from that centre. During the four years of the war, it made great progress through the country in all directions, especially along the lines of railroads, and by the movement of cavalry through the country woods. It is now all over our streets, and in waste-places, but not as conspicuous as the other weeds, as it is kept well cropped by animals.

I said there was something like rotation observable in the predominance of these "domesticated weeds." Not many years ago, the Florida coffee, *Cassia occidentalis*, was perhaps the most abundant weed about the streets and waste-places. *Maruta Cotula* (wild chamomile) was also very common. Both of these have decreased in quantity, and seem to be on the decline, or at least not able to struggle against those which now have possession. Is the rotation due to natural causes, viz., the exhaustion of the soil by one plant, and its rest and restoration by others? Or is it the result of greater potency in the conquering plant? Are these champions now in possession to hold their guard until displaced by a superior race, or will they be compelled by natural causes to give way to a new race of settlers?

Aiken, S. C.

H. W. RAVENEL.

Notes on the White Mountains Flora.—A note concerning Mr. Prime's collections in this valley reported in the BULLETIN for August, induces me to send you a few lines in regard to my own observations. I have been here since early in July, and have kept a record of all the plants, whether in fruit or flower, that I chanced to see. I have also collected quite largely. When I first came, the charming *Linnaea* was in its beauty, forming odorous mats on the banks of the Copper Mine Brook. Under the pines, too, I had the pleasure of gathering *Moneses uniflora* for the first time. Characteristic regional plants that I have since found have been *Pyrola minor* and *Geum macrophyllum*. Near Bridal Veil Falls I came upon a nice lot of *Habenaria orbiculata*. Near the famous Flume I gathered quite a quantity of *Habenaria dilatata*. The character of the vegetation is extremely boreal, much like that of New Brunswick. *Oxalis acetosella*, *Clintonia borealis*, *Tiarella cordifolia*, *Streptopus* of both species, and *Trilliums* abound. The prevalent *Solidago* now in bloom in the valley is *S. arguta*. *S. thyrsoides* is to be found up the brook, where I also have my eye on several *Nabali*. I have not yet climbed to alpine heights, but have been surprised to find how high up grow the common yarrow and *Aralia hispida*. I also find *Microstylis monophyllos* at a considerable elevation.

There are no oaks or chestnuts here, nor sassafras. The almost primeval forests are made up of giant pines, rising to over a hundred feet and then feathering out into foliage; birches, beeches, ashes, mountain-ashes, larches and spruces. There are magnificent specimens of all these.

The prevalent weed here is the yarrow (*Achillea millefolium*); the ox-eye daisy is very rare. On the other hand, *Rudbeckia hirta* is common. I have seen but one specimen of *Lappa major*. There are no wild roses or grapes. But two clumps of *Adiantum pedatum* have as yet turned up, and I have seen no rare ferns.

The moss-flora is absolutely bewildering; mosses coat every windfall, every rock, and standing tree. One gathers a mat of what he thinks is one species, and finds he has half a dozen. I should call it the region of mosses.

The other day I saw a *Medeola* in which the three upper leaves were felted together so as to form a nest for a spider. This creature, which I found within, exactly imitated the curious flower of the plant which has to me always had an arachnoid appearance.

Franconia, N. H., Aug. 5th.

W. W. BAILEY.

Vincetoxicum scoparium (*Cynanchum scoparium*, Nutt. ; *Cynotonum? scoparium*, Chapm.)—It may be as well to record the fact that this plant, whose habitat has been referred to Florida and the West Indies, I found a few years since on an island in May River, not far from Hilton Head; and lately, still more abundantly on a small uncultivated island between Pinckney's Island and the mainland. It is not alluded to by Elliott, whose home was in Beaufort, about twenty to twenty-five miles off. I find the vines climbing the trees some fifteen to twenty feet high; but, when prostrate, they form dense, mat-like beds or masses of several feet in extent.

Bluffton, S. C., Aug. 8, 1882.

J. H. MELLICHAMP.

Notes from North Carolina.—*The North Carolina Crocus.*—In North Carolina there is no other native plant called "crocus," and this appellation to *Epigaea repens* is now never heard.

The use of the word "crocus" for trailing arbutus is no more singular than the local employment of the word "tuckahoe" for *Orontium aquaticum*. How this word was first employed in this way is not known, but it may have had its origin in the Indian word "taw-kee," which Prof. Meehan (Flowers and Ferns U. S.) says was the name used by the Indians for *Orontium*. He quotes Kalm's Travels.

Another curious localism is the name "hog-eye" for *Dionaea muscipula*. This is confined to Duplin Co., N. C., and heard nowhere else, I believe. The lobes of the leaf of the *Dionaea*, with their fringed edges, bear a sufficient resemblance to two upper eyelids joined at their base, to have caused Dr. Curtis to notice the fact in a description of the plant.

New Station for Lygodium palmatum.—Heretofore, *Lygodium palmatum* has been found only in the mountain regions of the State. It is now discovered in Duplin County, near the sea-coast.

New Station for Epidendrum conopseum.—This plant was found growing on the limb of a white oak, in Pender County. It does not appear at all in Curtis's Catalogue.

Wilmington, N. C.

THOMAS F. WOOD.

(A propos of Dr. Wood's remark on *tuckahoe* in the above notes, it may be stated that this name, meaning "something round," was applied by the Virginia Indians primarily to that curious subterranean, often nearly globular production, still called "tuckahoe," and which was used for making a sort of bread (*taccaho appoans*, "tuckahoe bread."—Strachey.) The name was also applied to several

round or roundish roots (tubers) and was extended to some which (like the starchy rootstock of *Orontium*), though not round, were used like the others as a bread material.

The names given by Kalm for *Orontium* (*tawkec*, *tawkim*, *tackuim*) and for *Peltandra* (*tuckah*, *tawking*) are Swedish corruptions of the Delaware Indian name for these bread materials; a term having about the same meaning as tuckahoe, and being from the same Algonkin root—Abnaki, *petegwi*; Massachusetts, *petukki*; Delaware, *p'tucqui*, "round," or "that which is round."

In some of the northern dialects of the Algonkin, the equivalent of tuckahoe—Mass., *petukquineg*, Narrag., *puttuckqunnege*, Mohican, *'tuquauh* or *'tuquogh*, literally "a round thing" or "something round," had the secondary meaning of a "loaf of bread" or a "cake"; but the Virginian term, and its Delaware equivalent, seems to have had the secondary signification of "bread root."—ED.)

Abnormal Botrychium.—When at West Point in July, I took a walk with Mr. E. S. Denton, which I shall not soon forget. My companion, who is an enthusiast in botany, showed me some of his favorite localities; among them, one for *Campthorus*. It was a wild place on the side of a mountain, amidst broken boulders and wind-falls—a spot to delight a collector. Here I found, what I specially wish to note, a specimen of *Botrychium Virginicum*, Swz., with three fertile segments to the frond, all well developed. The stipes were confluent only for about two inches above the point at which the barren frond diverged; above this, entirely distinct and fully fruited. As abnormalities in *Botrychia* are just now made interesting by Mr. Davenport, this note may be worth recording. I retain the specimen described.

W. W. BAILEY.

Query for Readers of the Bulletin.—Is there any reason for the statement by country people in various parts of the Union that the beech is never struck by lightning? The question is extra-botanical, perhaps, yet of some possible interest to collectors who may, in thunderstorms, take refuge *sub tegmine fagi*.

W. W. BAILEY.

Tricardia Watsoni.—On looking over my note on *Tricardia* in the July BULLETIN, I notice that the printer has left out a line of my manuscript, as I am made to say that "Watson found * * * a single specimen at St. George, Utah;" while Mr. Watson was never there at all.* It should have been said that Mr. Watson collected specimens of it near Truckee, Cal., and Dr. Parry collected a

* Upon consulting Mr. Jones's manuscript, we find that, as he states, the printer omitted several words in one of his sentences. We must confess that the proof of neither of Mr. Jones's notes in the July number was read with sufficient care, or compared with his MS.; for, had either been, we should have detected not only the error here alluded to, but also one in his Fern Notes, where, by slip of the pen, he wrote *Botrychium* instead of *Ophioglossum*.—ED.

single specimen at St. George, Utah. In addition to my former note, I have to add that I have since discovered several fruiting specimens of *Tricardia* at Hawthorne and Candelaria, Nevada. The plant occurs sparingly along the eastern base of the Sierras, from Reno to the southern boundary of Nevada.

Salt Lake City, July 24.

MARCUS E. JONES.

Botanical Notes.—*The Colors of Flowers.*—In an interesting article by Grant Allen, in *Nature*, on 'The Colors of Flowers, as illustrated by the British Flora,' the author says :

The different hues assumed by petals are all, as it were, laid up beforehand in the tissues of the plant, ready to be brought out at a moment's notice. And all flowers, as we know, easily sport a little in color. But the question is, do their changes tend to follow any regular and definite order? Is there any reason to believe that the modification runs from any one color towards any other? Apparently, there is. All flowers, it would seem, were in their earliest form yellow; then some of them became white; after that, a few of them grew to be red or purple; and, finally, a comparatively small number acquired various shades of lilac, mauve, violet, or blue.

Some hints of a progressive law in the direction of a color-change from yellow to blue are sometimes afforded us even by the successive stages of a single flower. For example, one of our common little English forget-me-nots, *Myosotis versicolor*, is pale yellow when it first opens; but as it grows older, it becomes faintly pinkish, and ends by being blue like the others of its race. Now, this sort of color-change is by no means uncommon; and in almost all known cases it is always in the same direction, from yellow or white, through pink, orange, or red, to purple or blue. Thus, one of the wall-flowers, *Cheiranthus chamaeleo*, has at first a whitish flower, then a citron-yellow, and finally emerges into red or violet. The petals of *Stylidium fruticosum* are pale yellow to begin with, and afterwards become light rose-colored. An evening primrose, *Oenothera tetraaptera*, has white flowers in its first stage, and red ones at a later period of development. *Cobaea scandens* goes from white to violet; *Hibiscus mutabilis* from white through flesh-colored, to red. The common Virginia stock of our gardens (*Malcolmia*) often opens of a pale yellowish green; then becomes faintly pink; afterwards deepens into bright red, and fades away at last into mauve or blue. Fritz Müller noticed in South America a *Lantana*, which is yellow on its first day, orange on the second, and purple on the third. The whole family of *Boraginaceae* begin by being pink, and end by being blue. In all these and many other cases the general direction of the changes is the same. They are usually set down as due to varying degrees of oxidation in the pigmentary matter.

If this be so, there is a good reason why bees should be specially fond of blue, and why blue flowers should be specially adapted for fertilization by their aid. For bees and butterflies are the most highly adapted of all insects to honey-seeking and flower-feeding. They have themselves on their side undergone the largest amount of specialization for that particular function. And if the more special-

ized and modified flowers, which gradually fitted their forms and the position of their honey-glands to the forms of the bees or butterflies, showed a natural tendency to pass from yellow through pink and red to purple and blue, it would follow that the insects which were being evolved side by side with them, and which were aiding at the same time in their evolution, would grow to recognize these developed colors as the visible symbols of those flowers from which they could obtain the largest amount of honey with the least possible trouble. Thus it would finally result that the ordinary unspecialized flowers, which depended upon small insect riff-raff, would be mostly left yellow or white; those which appealed to rather higher insects would become pink or red; and those which laid themselves out for bees and butterflies would grow for the most part to be purple or blue. Now, this is very much what we actually find to be the case in nature.

The Variability of Oaks.—In some remarks upon a note by Mr. Meehan, on 'Hybrid Oaks,' which appeared on page 55 of the BULLETIN, M. DeCandolle (*Arch. des Sci. Phys. et Nat.*, p. 557) says that it is interesting to find that in a *Quercus robur* raised in America, a country to which the species is not indigenous, and one in which no allied form exists to cross with it, the same mixture of forms has been observed that he called attention to in 1862, when he reduced the so called species *Q. pedunculata* and *Q. sessiliflora* to *Q. robur*. M. DeCandolle remarks that "many similar facts have been noted in annual or perennial plants introduced into cultivation, and no one, it seems to me, can doubt that variations sometimes occur without hybridization."

Botanical Literature.

Sylloge Fungorum omnium hucusque cognitorum. By Prof. P. A. Saccardo. Large 8vo., pp. 768. Padua, Italy.

The first volume of this long-expected work has at length appeared, and will help to fill a want long felt by all students of mycology. It forms a large octavo of 768 pages, with descriptions of about 2,900 species of Sphaeriaceous Fungi. Adding much to the practical value of the work are the *habitat lists*, giving in alphabetical order the names of the trees and plants on which the different species grow. The volume is published at 49 francs, which, considering the labor of preparing such a work, is very reasonable. It is to be hoped that the demand for this first volume may be such as to encourage the author to go on with the compilation of the remaining orders.—J. B. E.

BOOKS AND PAMPHLETS RECEIVED.

Index to the Genus Carex of Gray's Manual. By Jos. F. James. 8vo., pamph., pp. 11. (Reprint from the *Botanical Gazette*.) From the author.

Contributions to the Flora of Iowa. Nos. iv. and v. By J. C. Arthur. 8vo., pamph., pp. 4 and 5. (Extracts from *Proceedings* of the Davenport Acad. Sci.) From the author.

Darwin considéré au point de vue des causes de son succès et l'import-

- ance des ses travaux.* Par Alph. DeCandolle. 8vo., pamph., (Extract from *Archives des Sciences Physiques et Naturelles.*) From the author.
- Our Native Ferns and their Allies.* By L. M. Underwood, Ph.D. 12mo., pp. 134. From the author.
- Chas. Robert Darwin.* By Jos. F. James. 8vo., pamph., pp. 7. (Extract from *Journal* of the Cincinnati Society of Natural History.) From the author.
- Notes on the Native Trees of the Lower Wabash and White River Valleys, in Illinois and Indiana.* By Robert Ridgway. 8vo., pamph., pp. 40. (From *Proceedings* of the U. S. National Museum.) From the author.
- The New Botany*, a Lecture on the best method of teaching the Science. By W. J. Beal, M.Sc., Ph.D. (Second edition.) 8vo., pamph., pp. 16. Philadelphia: C. H. Marot. From the publisher.
- Sur un caractère de la Batate*, dont la singularité dans la famille des Convolvulacées n'a pas été suffisamment remarquée:
- Observation de M. Meehan sur la variabilité du Chêne rouvre*, et remarque de M. A. De Candolle. Par Alph. De Candolle. 8vo. pamph., pp. 8. (From *Archives des Sciences Physiques et Naturelles.*) From the author.

SERIAL PUBLICATIONS.

- Proceedings* of the Academy of Natural Sciences of Philadelphia. Part i. Jan. to April. (June, 1882.)—'Fruiting of *Ginkgo biloba*,' by Thomas Meehan; 'New Station for *Corema Conradii*,' by Aubrey H. Smith; 'Relation of Heat to the Sexes of Flowers,' by Thomas Meehan.
- Proceedings* of the Boston Society of Natural History. Part iii. Oct., 1881—Jan., 1882. (July, 1882.)—'Temperature of Trees,' by D. P. Penhallow.
- Transactions* of the Massachusetts Horticultural Society for the year 1881. Part ii. (June, 1882.)—'Our Native Plants adapted for Winter Culture for their Flowers,' by Mrs. T. L. Nelson; 'List of Edible Fungi,' by Dr. E. L. Sturtevant; 'Date of Flowering of Trees and Shrubs in Eastern Massachusetts, in 1881,' by John Robinson.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College on Tuesday evening, June 13th, the President in the chair and twenty-seven members present.

New Stations.—Mr. Britton exhibited specimens of *Helonias bulbata*, L., from near Rossville, Staten Island; of *Corema Conradii*, Torr., collected by Mr. C. E. Smith on the Shawangunk Mountains; and of *Triticum violaceum*, Hornm., collected by Prof. T. C. Porter near Andover, Sussex County, N. J., and new to the flora of that State. Judge Addison Brown reported the detection by him of *Xerophyllum setifolium*, Michx., at Ocean Beach, N. J., a somewhat northerly station for it, and stated that *Hudsonia ericoides*, L., was very abundant in the same neighborhood.

Teratological Specimens.—Mr. Britton showed specimens, from Staten Island, of *Alnus serrulata*, Ait., exhibiting phyllody of the bracts, and a specimen of *Anemone thalictroides*, Michx., in which there was an entire suppression of the involucre. Mr. Hogg exhibited specimens of *Convallaria majalis*, L., showing a peculiar change, due, apparently, to a fission of the pedicels. Each division of the latter bore a flower which was somewhat smaller than the normal size, and which in several of the plants was of a decidedly pink color.

The Librarian reported the addition of a large number of books and pamphlets to the library since the date of the last meeting.

The chairman of the Field Committee reported on the field meetings that had occurred up to date, and, in connection therewith, Miss Knight gave an account of the mosses that had been collected during the various excursions.

One corresponding member was elected and nine names were proposed for active membership.

At the regular meeting of the Club held Monday evening, July 8th, the President occupied the chair and fifteen persons were present.

Dr. O. R. Willis remarked upon some recent additions to the flora of Westchester County, and made known an interesting locality that had been little explored by botanists.

Dr. Barstow exhibited, distributed and remarked upon numerous specimens of cultivated plants, which he had brought to the meeting from his grounds in Flushing.

Prof. Day reported *Coronilla varia*, L., escaped from cultivation at Portchester, and *Vincetoxicum nigrum*, L., at New Rochelle.

The chairman of the Field Committee gave an account of the field meetings that had taken place since the last meeting, and stated that Garretson's, S. I., had proved a new locality for *Lysimachia thyrsiflora*, L., and *Festuca nutans*, Willd.

Mr. W. H. Weed showed specimens of *Polyporus hirsutus*, L., which he had obtained in a mine in Pennsylvania at a depth of 290 feet. The specimens were normal, showing none of those distortions usually observed in fungi growing in such localities.

Adhesion in Fruits.—Mr. Britton exhibited an example of syncarpy in the cherry, wherein two drupes were united into one, the adhesion extending to the stones; and also a case of adhesion of two syncarps in the common raspberry.

Nine persons were elected active members.

The Librarian read a lengthy list of books and periodicals that had been received since the last meeting.

*Adjourned to September.

Necrology.—Mr. George Fowler Dickie communicates to me the sad intelligence of the death of his father, Dr. G. Dickie, F.L.S., a well known Scottish algologist of Aberdeen, on Saturday, July 15th.

A. B. H.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. IX.]

New York, October, 1882,

[No. 10.]

New Western Plants.

By EDWARD LEE GREENE.

LINUM (HESPEROLINON) CLEVELANDI.—Slender and diffusely paniculate, $\frac{1}{2}$ –1 foot high, glaucous and, to the naked eye, smooth, but under a lens minutely scabrous-puberulent; leaves alternate, linear-lanceolate, 3–6 lines long; stipular glands wanting; pedicels solitary in the axils of the leaves, 6–10 lines long; sepals ovate, acute, smooth and entire, only a line long; petals yellow, 2-toothed at base, not much exceeding the sepals; styles 3; capsule obtuse, little exceeding the calyx.

Collected in the vicinity of Allen's Springs, Lake County, Cal., June, 1882, by Mr. D. Cleveland.

A very well-marked species, to come in between *L. micranthum* and *L. adenophyllum*; differing from the former in its yellow flowers, and from the latter by the absence of glands.

ASTRAGALUS CLEVELANDI.—Sparingly and minutely appressed pubescent, or at length nearly glabrous, stems rather slender, a foot or more high, from a perennial root; leaflets 15–19, oblong-lanceolate, less than a half inch long; peduncles longer than the leaves, and bearing slender racemes 3–6 inches long; flowers hardly more than 2 lines long; the calyx rather villous, its subulate teeth about equalling the tube; corollas white or cream-colored; pod unknown.

Collected in Indian Valley, Lake County, Cal., June, 1882, by Mr. D. Cleveland.

A species whose singularly long racemes of small whitish flowers give it a very striking likeness to *Melilotus alba*.

SAXIFRAGA MALVAEFOLIA.—Near *S. Parryi*, but much larger; scape a foot or two high, minutely and rather sparingly glandular-puberulent; leaves rounded-cordate, obscurely lobed and closely toothed, an inch or more in diameter, on petioles somewhat shorter, hairy on the veins beneath, and appearing with the flowers; flowers few and rather large, in a cymose panicle; calyx-teeth triangular, equalling, or even somewhat longer than the short tube, which is truncate at base, and not conspicuously nerved; petals white, obovate-oblong, inserted by short claws nearly in the sinuses of the calyx; filaments subulate, borne a little lower down; carpels united to near the abruptly and widely diverging summits; style stout, shorter than the beak; root woody-fibrous, with no trace of corm.

Known only by a single specimen, said to have been brought from Santa Rosa Island, off the coast of California.

Though closely allied to *S. Parryi*, Torr., it is very distinct, having no corm or bulb, and sending up its leaves and scapes simultaneously. Its calyx is much broader and shorter than in that species, and it is a much larger plant; moreover, its leaves are of thicker texture, scarcely lobed at all, resembling those of *Malva rotundifolia*.

CHAMAESARACHA PHYSALOIDES.—Annual (?), glabrous, stems apparently a foot or two high, with spreading, slightly wing-angled branches; leaves ovate, an inch or more long, the lower nearly entire, the upper with coarsely sinuate-toothed margins; flowers on slender pedicels nearly two inches long; calyx small, and, with the upper portion of the pedicel, puberulent with minute, flat, scale-like hairs; corolla cream-colored, $\frac{3}{4}$ inch broad; fruit unknown.

Collected in the Patagonia Mountains of the southern part of Arizona in the month of August, 1881, by Mr. S. P. Buckminster, in a single branch only, which shows a true *Chamaesaracha*, as to calyx and corolla, with the general aspect of an annual *Physalis*.

HOLOZONIA, *Gen. nov.*

Head heterogamous, with 6–8 pistillate, fertile rays, and about 16–20 hermaphrodite but sterile disk-flowers. Involucre of as many herbaceous scales as there are ray flowers, each scale completely and closely enfolding its obovate-oblong, obcompressed, smooth akene. Receptacle small, flat, its chaff united into a tubular, 10–12-toothed cup enclosing the disk-flowers. Corollas white; those of the ray purple-tinted, deeply cleft into 3 linear divisions, open during the whole day; those of the disk 5-lobed, Pappus of the ray a hyaline, saucer-shaped, entire crown; of the disk, a pair of extremely slender, deciduous scales, which equal the corollas.

A Californian herb, between *Hemizonia* and *Lagophylla*, but of very distinct generic type, with the aspect of the former, and the obcompressed, completely enfolded ray-akenes of the latter, but differing from it by its perennial root, its united chaff, and especially by the remarkable pappus of both ray- and disk-akenes.

HOLOZONIA FILIPES (*Hemizonia filipes*, Hook. & Arn., Bot. Beech. Suppl. 356. *Lagophylla filipes*, Gray, Bot. Whipple, 109. Bot. Mex. Bound. 101. Bot. Cal. i, 367.)—The plant has been long known in a very imperfect way. It is not in the least strange that the author of the Botany of Capt. Beechey's Voyage should have placed it in *Hemizonia*, for its whole aspect is so extremely like *Hemizonia lusulaefolia*, with which it grows, that the present writer, at first sight, passed it by for a mere slender form of that species. Dr. Gray, before the fruit was known, transferred it to *Lagophylla* on the strength of the complete enclosure of the ray-akenes by the involucre scales; but that is its only point of contact with that genus. It has still the chaffy cup of *Euhemizonia*, as also its numerous white flowers.

But, while the character of its akenes forbids its admission to *Hemizonia*, its perennial, rhizomatous root, and very singular pappus as certainly exclude it from *Lagophylla*. The first specimens of this rare plant, showing mature akenes, and exhibiting the unexpected character of the root, were collected by the writer, in October, 1881, almost within the limits of the village of Napa. The above generic character is drawn from these specimens, supplemented by others which came, this year, from the vicinity of the Napa Soda Springs.

The character of *Lagophylla* is strengthened by this plant's re-

moval from it. Its three species agree in habit, in their annual root, their few-flowered heads, their yellow rays (always 5) which are not open much after sunrise, and in their akenes, both of ray and disk, being wholly destitute of pappus.

An Imperfectly-described Phalloid.

*Indexed
Nov. 1882.*

By CHARLES H. PECK.

(Plate xxv.)

The description of *Phallus Ravenelii*, B. & C., as published in *Grevillea*, Vol. ii, p. 33, is somewhat imperfect, and efforts to identify the specimens by it are likely to be unsatisfactory and perplexing. I could not myself feel fully satisfied that my specimens belonged to this species until, through the kindness of Mr. H. W. Ravenel, who first collected specimens of it, and for whom it was named, I was permitted to see the manuscript description which he made of it at the time of its discovery. His description is so full and agrees so accurately with my specimens that there is no longer any room for doubt concerning their identity, nor concerning the real characters of the species. The growing interest in these curious plants, and the desirableness of having the specific characters fully published, must be my apology for the notes here given.

Phallus Ravenelii is furnished with an indusium or veil, although the published description makes no mention of it. This omission, however, has been supplied by Prof. W. G. Farlow in his remarks concerning this species in the *Bulletin* of the Bussey Institute, 1878, p. 247; and the presence of the veil is also indicated in the *TORREY BULLETIN*, Vol. vii, p. 11, where Mr. W. R. Gerard has listed this species, with several others, in the section *Hymenophallus*, whose chief distinguishing characteristic is the veil. In our other indusiate species the veil is so large that it depends below the margin of the pileus in a conspicuous manner; and it is generally net-like in structure because of its numerous perforations. In this species the veil is without perforations and is divided into two parts, one of which is attached to the top of the stem and is concealed beneath the pileus, while the other is attached at the base of the stem and is concealed within the bulb. Sometimes there is also a small intermediate fragment which adheres to and surrounds the middle of the stem, but this is unusual. According to Mr. Ravenel's observations, while the stem and pileus are yet encased within the bulb these two parts of the veil are united, but as the stem elongates they are torn asunder, the one being carried up with the pileus, the other remaining in the bulb.

In *P. indusiatus*, *P. duplicatus* and *P. impudicus* the denuded pileus is coarsely reticulate-pitted, resembling in some degree the pileus of morels (*Morchella*), but in this species its structure is very different. In the description, the pileus is said to be "even," but in reality it is full of minute cells or cavities and has a cellular-spongy structure similar to that of the stem. These cavities or perforations in the upper or exterior surface are smaller than those of the lower or interior surface. They become visible when the spores have disappeared.

In some specimens the perforation or umbilicus at the apex of the pileus is rather large, with a broad margin, giving a truncate appearance such as is ascribed to the species; but in many specimens the apex is more rounded or obtuse, and would not be regarded as truncate. The apical perforation, which in other species communicates with the interior of the stem, in this one is closed, at least in recently developed specimens, although specimens are sometimes found in which the closing membrane has disappeared and the pileus is clearly perforate. This membrane, however, when present, is so depressed or sunk below the surface that it is liable to be overlooked. It makes the pileus umbilicate rather than perforate. Possibly it was this peculiarity of structure that led Rev. C. Kalchbrenner in his paper on New or Little-known Phalloidei, p. 16, to place this species with the *Cynophalli*. Whether this and the other peculiarities of structure already pointed out warrant the separation of this species from the other Hymenophalli or not I leave for other mycologists to decide. The noticeable characters of this species may be grouped together thus :

Bulb ovate, pinkish, sometimes marked by a few irregular, elevated lines or wrinkles, after rupturing slightly split on the margin; pileus conical or ovate-conical, at first covered, except at the apex, by the olive-green spore-stratum, minutely cellular-spongy, umbilicate at the apex, whitish when denuded; stem cellular-spongy, hollow, subcylindrical, tapering upwards within the pileus and surrounded at the top by a short, entire, pendent membranous veil, also tapering downwards within the bulb and surrounded at the base by a similar cup-shaped veil, whitish; spores narrowly elliptical, .00016"—.0002' of an inch long, about half as broad.

Plant 4-6 inches high, pileus 1-1.5 inch high, stem 5-7 lines thick. The plant has a wide range. Specimens have occurred in South Carolina, Wisconsin, Ohio, Connecticut, Vermont and New York. It has been found growing in fallow land, among rubbish in open waste-places, among fallen leaves in dry woods and in "cedar swamps." It occurs from September to December. It was discovered by Mr. Ravenel in 1846, but appears to have remained unpublished till 1873.

EXPLANATION OF THE PLATE.—Fig. 1, a fully developed plant of *Phallus Ravenelii*, B. & C. Fig. 2, the upper part of a stem and its denuded pileus. Fig. 3, vertical section of a plant showing the interior surfaces of the bulb, stem and pileus, and the position of the two parts of the veil. Fig. 4, six spores x 400.

A New Crucifer from Mexico.

By M. E. JONES.

DRABA UNILATERALIS, n. sp.—Annual, branching at the base and sending out numerous, horizontal, very slender, runner-like branches, 3'-10' long, which are leafless except at the very base. Leaves obovate or oblanceolate, petioled (except the uppermost), sometimes 1-3-toothed, densely stellate-pubescent. Sometimes the whole plant is densely stellate-pubescent, even to the sepal and pods; but usually the ends of the longest branches, with their flowers and pods, are

glabrous. Petals oblanceolate, white, $\frac{1}{2}$ longer than the sepals. Pods about 2" long and $1\frac{1}{2}$ " wide, twisted, oval or obovate, nearly twice as long as the stout, reflexed or widely spreading pedicels, arranged about 1' apart all along the stem with pedicels turned so that the pods are all on the lower side of the stem, making the raceme appear scorpioid. The stems show a decided tendency to twine, but they seldom make a complete loop.

This unique crucifer, which scarcely seems like a *Draba*, I discovered about fifteen miles south of the California line in Mexico about sixty miles from San Diego, on April 7th, 1882.

I have many specimens of a form of *Clematis ligusticifolia* with perfect flowers. The plant grows along the coast, north of San Francisco.

The Tuckahoe.—In Virginia and in Maryland this name is applied exclusively to that curious subterranean tuber, *Pachyma cocos*. This tuber is found, I believe, in nearly all the Southern States, and as far north as Kent County, Delaware. In Virginia and in Maryland, when large, they are frequently roasted and eaten with salt by the negroes. This use of them they learned from the Indians, in whose "bill of fare" the tuckahoe, so-called, was quite an important element. It grows several feet below the surface of the ground and is met with only by accident, as in clearing up the land and in making ditches in damp places. When first taken from the earth the tubers are soft enough to be cut with a knife. In shape, they vary, some being oblong like a sweet potato, others globose and, with their coarse brown bark, looking like a cocoanut. They also vary in size; I have seen them as large as a man's head. The internal substance is white, has a fungoid odor and a taste that I have found mild and pleasant, although it has been described as acrid.

The tuckahoe is most mysterious in its habits. There is at no time any external indication of its existence beneath the surface of the ground. Hogs are very fond of it, and root it up as they do the truffle. The internal substance contains an abundance of branching filaments; but no fertile form of the plant can be found, though some effort has been made to do so the past two seasons.

Tradition says that the Indians had another mode of preparing it, by drying and pounding as they did corn, then converting it into bread.

Baltimore, Md.

MARY E. BANNING.

(By request, we append the following additional notes on a production that has always been a puzzle to botanists, and the origin of which still remains a conjecture.

Tuckahoe occurs from New Jersey southward to the Gulf of Mexico, and westward to Kansas. It is usually found at planting time, when it is turned up by the plow. It often gives no indication of having been attached to anything, although occasionally (especially in the West) it has been found apparently parasitic on the roots of large trees; and, again, detached specimens have been found with a piece of root enclosed in the mass. It was first brought to the notice

of the public by Dr. Clayton, who, under the supposition that it was a fungus belonging to the same order as puff-balls, sent it to Gronovius under the name of *Lycoperdon solidum*, and, as such, described it in the Flora Virginica. This was about one hundred and forty years ago. Next it was described by Schweinitz, in his Synopsis of the Fungi of North Carolina, under the name of *Sclerotium cocos*, and by Fries, in his Systema Mycologicum, under the name of *Pachyma cocos*. At about the time Schweinitz described it, Dr. Macbride, of South Carolina, communicated to the Linnaean Society of London his own observations on the supposed fungus. The late Dr. Torrey, unaware of the fact that he had been anticipated by Schweinitz, described the production, about the year 1819, in the New York Repository, under the name of *Sclerotium giganteum*, and also published the results of a chemical analysis of it. Dr. Torrey ascertained that, while chemical tests failed to detect the presence of starch (which the microscope had also failed to show), the mass consisted almost entirely of a singular substance which he called sclerotine. Braconnot, some years after this, described the same principle (which in some of its modifications is the jelly of fruits) as pectine. Tuckahoe, possessing no cellular structure, no mycelium and no trace of fructification, was long ago removed from among the fungi, and is now considered by the Rev. M. J. Berkeley and other mycologists as a secondary product, caused by the degeneration of the tissues of some flowering plant, in which a change has occurred similar to that which converts animal tissue into adipocere, and in which the cellulose and all other principles are transformed into a body of the pectose group. This, however, is conjecture merely, against the probable truth of which is the fact that no intermediate states have been found, while none, large or small, presents any trace of plant-structure. Owing to the fact that it is sometimes found attached to the roots of trees, especially those of the fir, Currey and Keller consider it to be an altered state of these occasioned by the presence of a fungus, the mycelium of which traverses, disintegrates, and even obliterates the bark. This view seems to be sustained by the analyses of R. T. Brown (1871) and J. L. Keller (1876). The former found it to be composed of water, 14 per cent.; glucose, 0.93 per cent.; gum, 2.63 per cent.; pectose, 64.45 per cent.; cellulose, 17.34 per cent.; ash, 0.16 per cent., and nitrogen only 0.36 per cent. Keller found 77.27 per cent. of pectose; 3.76 per cent. of cellulose; 3.64 per cent. of ash, and other things in about the same proportion as Brown did. Owing to its chemical composition, the tuckahoe is very nutritious, and was from early times used as a food by the Indians, as implied in its common names "Indian bread" and "Indian loaf." It is also said to be employed, boiled in milk, as a substitute for arrowroot in summer complaints, in the Southern States.

A product which is thought to be the same as tuckahoe grows in China, and is sold as food in the streets of Shanghai under the name of fûh-ling. An account of this is given by the Rev. M. J. Berkeley in the Proceedings of the Linnaean Society of London.)

Arthrocladia villosa, Duby.—Dr. Farlow records that this rare and interesting alga was first found on the New England coast by

Mr. F. S. Collins at Falmouth Heights, Mass. Since then, two other collectors have obtained it in the vicinity of East Falmouth, in the waters of Vineyard Sound, at a place called Menauhant; viz., Rev. G. W. Perry of Auburn, Me., in the summer of 1881, and Mrs. H. L. Chambré of Fall River, Mass., in 1882.

These constitute the third and fourth recorded instances of its occurrence on the American coast. It was first found by Mr. Charles Congdon more than thirty years ago, cast ashore at Smithville near Wilmington, N. C. This specimen was figured and described by Harvey in the first volume of the "Nereis."

It had, however, been previously identified by Prof. J. W. Bailey, who received it from Mr. Hooper of Brooklyn, along with fifty or more other plants. I am fortunate enough to have the letter of Prof. Bailey to Mr. Hooper in which he makes report of his study of this lot of specimens. For sufficient reasons, he does not appear to have satisfactorily determined many of them, so he writes:

"You will see by the above how blind a guide I am in the path you have entered. I try to console myself for my incapacity, by saying that most of the specimens sent which I am in doubt about are not in a perfect and fully-developed condition, and that others are decidedly new, or, at any rate, not like anything in my herbarium.

I have worked hard at these specimens, have dissected every one of them, and compared them with everything which they at all resemble, and yet how few I have made out! However, I am paid for my labors by making out that curious plant M. 1. which beyond *any* doubt is the *Arthrocladia villosa* of Duby, a very rare plant and new to the American flora." As little confidence as Prof. Bailey felt in his knowledge of algae, he was about the only American who, at that time, knew anything at all about them.

Taunton, Mass.

A. B. HERVEY.

Rosa minutifolia.—Through the kind exertions of Miss F. Fish of Sauzal, mature fruit of this interesting species, described in the August number of the BULLETIN, has been obtained and is being widely distributed, so that we may hope soon to see it in cultivation. The fruit is globose, crowned with the persistent erect calyx-lobes, deeply red-brown, bristly-hispid; seeds generally few, bearing the woolly, at length deciduous style.

In the description of the flower it ought to have been mentioned that the outer calyx-lobes are pinnatifid, which however is alluded to at the end of the article. The locality is Sauzal, not Sanyal as printed.

GEORGE ENGELMANN.

Epipactis Helleborine, the orchis new to America, which was found near Syracuse in 1879, has been discovered growing in considerable quantity (100 to 200 individuals) on a wooded slope of Scajaquady's Creek, in the northerly part of this city. A specimen has been sent to Dr. Gray, who, while pronouncing it to be identical with the Syracuse plant, declares that he can discover no valid dis-

inction between it and *E. latifolia*. It is now to be looked for in other localities.

Buffalo, N. Y.

DAVID F. DAY.

Query.—Is it always the case that the common blue flag, *Iris versicolor*, changes the color of its flowers to white when removed from the swamps to garden cultivation? I have never seen any allusion to the fact, if it is so.

A few years ago, whilst in Darien, Ga., a lady showed me a white-flowered flag in her garden, and assured me that she had herself removed it from the neighboring swamp, and that it had become white after removal. Here, in the gardens in Aiken, there is plenty of it—all white-flowered. I have not been able to trace the origin of the plants directly, but they were probably brought from the swamps. Before seeing that in Darien, I had had reason to suspect such a change, and I make this note of inquiry whether it has been observed by others.

Aiken, S. C., Sept. 6th.

H. W. RAVENEL.

New Station for *Psilotum triquetrum*, Swartz.—Last week I found here six or eight specimens of this plant growing under a live oak and pine. It has been identified by Dr. Gray, to whom I sent it, and also by Mr. Ravenel of Aiken, S. C., who informs me that thirty-five years ago he met with the same in St. John's—Berkeley, in this State, but that he has not seen it since. He found about a half dozen specimens growing in an old deserted garden, under "wild orange-trees." Chapman says "*East Florida*."

Bluffton, S. C., Sept. 18, 1882.

J. H. MELLICHAMP.

***Echinosperrum Greenei*, Gray.**—As plants gathered by me about the middle of March at San Diego, Cal., and pronounced this species by Dr. Gray, do not agree in some respects with the description in the North American Flora, the following completer one is herewith given:

Annual, 3'-12' high, appressed-pubescent throughout, branching from the base, branches prostrate or ascending, weak; leaves linear-oblongate, the lower ones opposite and usually connate, often linear, bracts broader, sometimes narrowly oblong; racemes bracteate throughout; calyx white- or often yellow-hairy (hairs with a prominent pustulate base), lobes enlarging in fruit, open, lanceolate, acute, with a dense white tuft of hairs at the tip; flowers less than a line long, white; fruit scattered, lowest short-pedicelled, not joined to the stem; nutlets with three distinct (usually white) ridges running more or less regularly from the tip around the sides (but not on the angles) and down the centre to the base on the outer face, and usually with one intermediate one on each side; cross-ridges forming regular meshes with these, and from the angles thus formed arising straight prickles which are scarcely ever glochidiate and often not even barbed; the depressed meshes filled with from one to several tubercles; nutlets cuspidate, ovate, convex on the outer and inner faces; inner face reticulated but not armed, provided with a very prominent ridge running from the sharp tip to the large, almost deltoid scar at the base; angles rounded.

Dr. Gray informs me that the plant is quite rare. This, however, is not the case at and south of San Diego, where it is rather common, but appears to have been overlooked heretofore. The same is true of *Echidocarya Californica* and *Harpagonella Palmeri*.

Salt Lake City, Utah.

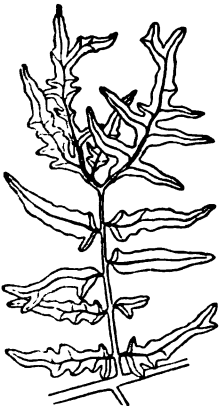
MARCUS E. JONES.

Adventitious leaf on Dandelion.—I have found to-day a dandelion (*Taraxacum Dens-leonis*) with a well-marked though small leaf on the otherwise naked scape. It is three inches below the involucre.

W. W. BAILEY.

Abnormal Growths in Ferns.—The following notes are from observations on specimens collected during the present season on Staten Island:

Pteris aquilina L.—Branches of the frond showing a great tendency to bifurcation. In the specimen figured, one of the branches is three times bifurcated, and many of the pinnae show the same tendency. In another specimen the pinnules are remarkably crenate and finely undulate on the surface, as if passed through a fluting-machine, with many edges fringed.



These two varieties were found in a limited locality, near Tottenville, in company with the var. *caudata*, Hook.,* gradually merging by every intermediate stage into the typical form.

Osmunda cinnamomea, L.—A fertile frond in which the upper half is composed of very much constricted sterile pinnae; apparently approaching var. *frondosa*, Gray, which is, however, distinguished by being fertile above and sterile below, the very opposite of the specimen in question.—Found near Garretson's; one specimen only.

Aspidium acrostichoides, Swartz, var. *incisum*, Gray.—A great many forms seem to be included under this variety. In some of the fertile fronds every one of the pinnae is constricted, and covered with fruit throughout its entire surface. From this extreme there is every intermediate stage to the typical form. In some, the tips only are fertile, in others, the fruit is scattered over the surface promiscuously, and in rare cases is arranged in regular rows as in *A. marginale*, Swartz. Only two localities have thus far yielded these forms; near Four Corners and Egbertville.

ARTHUR HOLLICK.

Botanical Notes.—*Expansive Power of Fungi.*—The marvellous expansive power resulting from the rapid growth of the soft cellular tissue of fungi was strikingly illustrated a short time since in a grain elevator at Buffalo, N. Y.

The asphalt flooring of the building was over a foot thick, in two

* It has been decided by Prof. Eaton that the variety found at Staten Island is not the true *caudata*.—ED.

layers: The upper layer was seven inches thick, and was laid hot, rolled down, and thoroughly cooled four years ago. Below this there was an old floor of tar and gravel, six inches thick. A curious bulge in the floor was first noticed, covering about a square foot. In six hours the floor was burst open, and a perfectly formed toadstool, with a stem two inches through and a very wide cap, made its appearance. Elsewhere the floor was smooth and unbroken.

The Sweet Potato.—In a paper which he has kindly sent us, M. DeCandolle calls attention to a character in the sweet potato plant to which sufficient attention has not been paid by systematists, and that is the radical tubercles ("sweet potatoes"), which exist in no other plant of the order Convolvulaceae. "In fact," says the author, "the dilated portions of *Convolvulus Jalapa*, *C. pentaphyllus*, *C. Scammonia*, etc., are caudices or rhizomes, as we may easily satisfy ourselves from figures worthy of confidence published in different works. I shall not stop to question whether in these species the expanded portion is the base of the stem or the principal root or a combination of both, this depending much on the character which we choose for distinguishing root from stem. It is sufficient to point out as a fact that in the sweet potato the expansions belong to lateral roots, while in the other species mentioned, it is the primary axis that becomes a tubercle. This difference is connected with other and greater ones. The roots of the sweet potato (*Convolvulus Batatas*, L.; *Batatas edulis*, Choisy) consist especially of a cellular tissue filled with fecula, and have a saccharine taste. The axillary tubercles, on the contrary, offer a remarkable complication of vessels and cells which secrete resinous matters. The sweet potato is good to eat, but the other roots, like the rhizomes of scammony, are eminently purgative. Generally, in this family, what belongs wholly or in part to the stems is more or less purgative, as the stems of *Convolvulus Sepium* formerly employed. * * * Whether we adopt the genus *Batatas* of Choisy, or whether we reject it, with Meissner, or as Messrs. Bentham and Hooker have done in their Genera; the peculiar and rare character of the roots of the sweet potato should be in some way made prominent, and it appears to be impossible to leave the plant immediately along side of the jalap. * * * The geographical origin of the sweet potato is still a problem. I have tried to solve it in a work now in press, entitled *Origin of Cultivated Plants*. The probability is in favor of an American origin, but there are very singular reasons for considering the question as doubtful."

The Gymnocladus as a Fly-Poison.—A Virginian correspondent of the *American Agriculturist* asserts that the male trees of the Kentucky coffee-tree (*Gymnocladus Canadensis*) have been long observed by him to be a sure insecticide. He says: "Back of our house here, and overhanging the piazza, is a very large coffee-tree. Though this locality is infested, like Egypt, with a plague of flies, we have never suffered any serious annoyance from them. One year this tree was nearly stripped of its leaves by a cloud of potato-flies (the blistering fly), and we feared that the tree would die from the complete defoliation. In three days, the ground beneath was black with a carpet of corpses, and the tree put out new leaves and still flourishes.

For ten years we have used the bruised leaves, sprinkled with molasses water, as a fly-poison. It attracts swarms of the noisome insects, and is sure death to them."

Although the seeds of *Gymnocladus* are harmless, and have been used as a substitute for coffee, the leaves of the tree are said to contain *cytisine*, a vegetable principle which, in certain doses, acts on the human subject as an acrid poison. It is perhaps to this principle that are to be ascribed the effects of the leaves as an insecticide.

Latent Vitality of Seeds.—Messrs. Ph. Van Tieghem and Gaston Bonnier have been making some preliminary experiments, says *The Gardeners' Chronicle*, to ascertain the effects of different conditions on the latent vitality of seeds. On January 9th, 1880, several packets of seeds supplied by Vilmorin were divided each into three equal parts. One portion was exposed to the free air, but secured from from dust; another portion was put into closed air, securely corked up in a tube; while the third was placed in pure carbonic acid. At the end of two years the seeds were taken out and weighed, and afterwards sown. With regard to weight, all the seeds exposed to free air showed an increase. Thus, for example, fifty seeds of the common pea were found to have increased about $\frac{1}{7}$ of their original weight; and fifty seeds of the French bean about $\frac{1}{8}$ of their original weight. The seeds confined in closed air increased in weight, but infinitely less than those exposed to free air, and the increase in some instances was so trifling as to be hardly measurable. Thus, fifty peas increased about $\frac{1}{100}$ of their original weight, and fifty beans about $\frac{1}{100}$ of their original weight. As for the seeds placed in carbonic acid, they did not vary half a milligramme from their original weight. The following are two examples of the comparative germination of the seeds, the conditions being as near as possible exactly the same:

Peas	left in the free air,	90 per cent. germinated.
"	" " closed air,	45 per cent. germinated.
"	" " carbonic acid,	0 per cent. germinated.
Beans	" " free air,	98 per cent. germinated.
"	" " closed air,	2 per cent. germinated.
"	" " carbonic acid,	0 per cent. germinated.

The Cross-fertilization of Flowers by Insects.—In his translation of Darwin's work on Cross-fertilization, M. Heckel, in a foot-note, urges, as a decisive argument against the cross-fertilization of flowers by insects, the fact that these latter auxiliary aids are absent from the flowery summits of high mountains, or at least are extremely rare there.

M. Ch. Musset, after four years' residence and observation at Grenoble, in the centre of a region which has all altitudes from 600 to 10,000 feet, comes forward with a note in the *Comptes Rendus* of the Académie des Sciences (T. xcv., No. 6), in which he fully confirms the views of Darwin, and shows that M. Heckel's objection must fall to the ground. He testifies as the result of manifold observations of his own, supported by the testimony of several distinguished botanists and entomologists of the region, that all orders of insects are represented up to an altitude of 9,800 feet; that above that height Lepi-

doptera, Diptera and certain Hymenoptera are more numerous than the other orders; that the number of genera, species and individuals of nectarophilous insects is proportional to that of flowers, and is sometimes incalculable; that the hours of opening and closing of nyctitropic flowers (which are much more numerous than usually believed) are synchronous with the awakening and sleep of insects; that the apparent number of nectarophilous insects is in physiological and physical relation with the number of their favorite flowers, the calorific and hygrometric, calm or troubled state of the atmosphere, and also with the rainy, stormy, dark or bright state of the sky.

M. Musset adds that dew is one of the predominant causes of the temporary absence of insects.

Botanical Literature.

Contributions to American Botany. X. By Sereno Watson. From the *Proceedings* of the American Academy of Arts and Sciences. Vol. xvii., pp. 316-382.

The contents of this tenth *Contribution* by Mr. Watson, which was presented to the American Academy of Arts and Sciences May 5th, and issued August 10th of the present-year, are: I. 'List of Plants from Southwestern Texas and Northern Mexico, collected chiefly by Dr. E. Palmer in 1879-'80. (Part 1. Polypetalae).—This collection was made in 1879, mostly in the region lying northwest of San Antonio, Texas, and along the routes from that place to Laredo and Eagle Pass on the Rio Grande, and in 1880 in the States of Coahuila and Nuevo Leon in Mexico. In addition, determinations are given of a collection made by Dr. J. G. Schaffner in the State of San Luis Potosi, as well as of some plants received from Prof. Alfred Dugès of Guanajuato, Mexico. Forty-six new species are described. II. 'Descriptions of New Species of Plants chiefly from our Western Territories'.—In this paper, descriptions are given of seventy-seven species, all but three of which have hitherto been unknown to science.

U. S. Commission of Fish and Fisheries. (Part vii.) Report of the Commissioner for 1879. Washington: Government Printing Office, 1882.

In this Report, just distributed, we find Prof. Farlow's elaborate account of the Marine Algae of New England—a paper which the author issued over a year ago in the form of a reprint, and which we noticed at some length at the time. (BULLETIN, Vol. viii., p. 94.)

SERIAL PUBLICATIONS.

Bulletin of the Buffalo Society of Natural Sciences. Vol. iv., No. 3. (August).—'The Plants of Buffalo and its Vicinity' (Part i.), by David F. Day.

The Syracuse Botanical Club.—We learn from Mrs. Rust that at the March meeting of the Syracuse Botanical Club the following officers were elected for the ensuing year: President, Mrs. M. J. MYERS; Vice-President, Mrs. D. F. GOTI; Recording Secretary, Mrs. HARRIET WHITE; Corresponding Secretary, Mrs. KATE S. BARNES; Treasurer, Mrs. ANNIE D. FAIRBANKS.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. IX.] New York, November, 1882. [No. 11.

Indeped New Species of North American Fungi.
By J. B. ELLIS.

HENDERSONIA RAUHL.—Pustuliform, on capsules of *Polytrichum formosum*. Spores oblong-elliptic, 2-nucleate, subhyaline, $9-11 \times 3\frac{1}{2} \mu$, on sporophores longer than the spores.

Found near Bethlehem, Pa., by Mr. E. A. Rau.

HENDERSONIA VIBURNI.—Perithecia bursting through the epidermis in little clusters like a *Valsa*. Spores elliptical, brown, 3-septate, $13-15 \times 5\frac{1}{2} \mu$, on slender sporophores 2-3 times as long as the spore.

On *Viburnum lentago*. Decorah, Iowa. E. W. Holway.

PESTALOZZIA JEFFERISII.—Pustules black, flat, erumpent, scattered; spores elliptical, 5-septate, brown except the terminal cells, $18-20 \times 7\frac{1}{2}-9 \mu$, on long slender pedicels, with a short ($15\frac{1}{2}-7 \mu$) oblique crest or beak.

On *Viburnum prunifolium*. West Chester, Pa. Haines, Everhart, Jefferis and Gray.

Differs from *P. rostrata* and *P. insidens* (28th Rep. N. Y. State Mus.) in the rather smaller spores and short terminal bristle.

PESTALOZZIA CAPITATA.—Pustules hysteriiform, erumpent, minute, often subseriate by confluence and bearing some resemblance to a *Puccinia*; spores clavate-oblong, 3-septate, the lower division hyaline, the others brown, colored part about $19 \times 7\frac{1}{2} \mu$, crest 3-parted, the divisions about as long as the spore, spreading and capitate at their tips.

On dead leaves of *Xerophyllum asphodeloides*. Differs from *P. clavata*, C. and E., in habitat and the capitate crest.

CHAETOMELLA STEVENSONII.—Perithecia ovate-globose, $\frac{1}{16}-\frac{1}{8}$ m. in diameter, beset with straight, bristle-like black hairs 120-190 μ long by about 7 μ thick at the base and gradually tapering to the tip, septate but so opaque that the septa are scarcely discernible; spores fusiform, curved, nucleate, subhyaline, $19-26 \times 2\frac{1}{2}-3 \mu$, on stout branching sporophores of about the same length as the spores.

On fading leaves of *Dentaria laciniata*. Fairmount Park, Philadelphia, Pa. W. C. Stevenson.

Differs from *C. atra*, Fckl., in its slenderer hairs, shorter sporophores, and spores nearly twice as long.

MELANCONIUM HYALINUM.—Bursting through the bark in a semi-transparent mass; spores ovate-pyriform, $11-13 \times 7\frac{1}{2}-8 \mu$.

On dead limbs of Lombardy poplar. Decorah, Iowa. E. W. Holway. No. 102.

Distinguished from *M. pallidum* by its smaller, differently shaped spores and lighter color.

SEPTOSPORIUM FULIGINOSUM.—Appearing like a coarse black pubescence on the bark. Erect hyphae about $\frac{1}{4}$ m. high, simple, sep-

tute, black; conidia clavate, $75-80 \times 15\mu$, contracted below into a slender stipitate base, pale straw-color.

On dead limbs of *Cornus florida*. West Chester, Pa. Everhart, Haines, Jefferis and Gray.

CORYNEUM JUNIPERINUM.—Forming little black, sphaeriaeform, scattered or aggregated, subconfluent tufts on living leaves of *Juniperus communis*. Conidia vermiform-cylindrical, about 6-septate, dark brown, $35-40 \times 6-8\mu$, on short, stout pedicels.

Decorah, Iowa, May 1882. E. W. Holway.

HELICOMA VELUTINUM.—Prostrate hyphae nearly obsolete, erect threads simple, subulate, septate, brown, $114-125 \times 3\frac{1}{2}-4\mu$; conidia with about two coils, brown and about 12-septate.

H. Curtisii, Berk., differs in its abundant creeping hyphae and its rather broader multiseptate conidia. *H. Mulleri*, Cda., has subhyaline spores not so closely coiled, and slenderer, and has also abundant prostrate hyphae. On decaying bark of *Magnolia*. Newfield, N. J.

The measurements not otherwise noted are in micromillimeters, i. e., thousandths of a millimeter.

North American Genera of Grasses.—Notes on Bentham's paper on Gramineae published in Vol. xix. of the Journal of the Linnean Society.

The subjoined list of genera of grasses is intended to comprise all those represented in North America, north of Mexico, arranged according to the system of classification of Bentham in the paper above referred to. Several genera, *Coix*, L., for example, are included that are only known as escapes from cultivation. *Isachne* is inserted without a number as it is doubtful whether it occurs within our limits.

Some of the notes appended to the list have already appeared in another publication, but as they comprise valuable matter for reference they may well appear again for the use of the readers of the BULLETIN. The writer has only recently been able to consult the paper by Bentham, or the matter here published would have been presented at an earlier date.

Series A. PANICACEAE.

- Tribe I. Paniceae.—1. *Reimaria*, Flügge. 2. *Paspalum*, Lin. 3. *Anthraenantia*, Beauv. (Aulaxanthus, Ell.) 4. *Amphicarpum*, Kunth. 5. *Eriochloa*, HBK. 6. *Beckmannia*, Host. 7. *Panicum*, Lin. 8. *Oplismenus*, Beauv. (Orthopogon, Br.) 9. *Chaetium*, Nees. (Berchtoldia, Presl.) 10. *Setaria*, Beauv. 11. *Cenchrus*, Lin. 12. *Pennisetum*, Pers. (Gymnothrix, Beauv.) 13. *Spartina*, Schreb. (Trachynotia, Mx. Limnetis, Pers.) 14. *Stenotaphrum*, Trin. (Diastemanthe, Steud.) 15. *Pharus*, Lin.
- Tribe II. Maydeae.—16. *Coix*, Lin. 17. *Tripsacum*, Lin. 18. *Zea*, Lin. (Mays, Gaertn.)
- Tribe III. Oryzeae.—19. *Hydrochloa*, Beauv. 20. *Zizania*, Lin. (Hydropyrum, Link.) 21. *Luziola*, Juss. (Caryochloa, Trin.) 22. *Leersia*, Sw. (Asprella, Schreb.) 23. *Alopecurus*, Lin.
- Tribe IV. Tristegineae, Nees.—24. *Thurberia*, Benth. (Sclerachne, Torr. Greenia, Nutt.) 25. *Polypogon*, Desf.

- Tribe V. Zoysieae.—26. *Hilaria*, HBK. (Pleuraphis, Torr.) 27. *Aegopogon*, H. B. (Hymenothecum, Lag.) 28. *Tragus*, Hall. (Lappago, Schreb.)
- Tribe VI. Andropogoneae.—29. *Imperata*, Cyr. 30. *Erianthus*, Mx. (Ripidium, Trin.) 31. *Elionurus*, H. B. 32. *Rottboellia*, Lin. f. 33. *Manisurus*, Lin. 34. *Ischaemum*, Lin. 35. *Heteropogon*, Pers. 36. *Andropogon*, L. 37. *Chrysopogon*, Trin. 38. *Sorghum*, Pers. (Blumenbachia, Koel.)
- Series B. POACEAE.
- Tribe VII. Phalarideae.—39. *Phalaris*, Lin. 40. *Anthoxanthum*, Lin. 41. *Hierochloa*, Gmel. (Savastana, Schrank.)
- Tribe VIII. Agrostaeae.—42. *Aristida*, Lin. 43. *Stipa*, Lin. 44. *Oryzopsis*, Mich. 45. *Milium*, Lin. 46. *Muhlenbergia*, Schreb. 47. *Brachyelytrum*, Beauv. 48. *Lycurus*, HBK. 49. *Hcleochloa*, Host. (Pechea, Pourr.) 50. *Phleum*, Lin. 51. *Coleanthus*, Seid. 52. *Phippsia*, Br. 53. *Sporobolus*, Br. (Vilfa, Beauv.) 54. *Epicampes*, Presl. 55. *Agrostis*, Lin. 56. *Arctagrotis*, Griseb. 57. *Cinna*, Lin. (Abola, Adans.) 58. *Gastridium*, Beauv. 59. *Deyeuxia*, Clarion. 60. *Ammophila*, Host. (Psamma, Beauv.)
- Tribe IX. Isachneae.—*Isachne*, Br.
- Tribe X. Aveneae.—61. *Aira*, Lin. 62. *Deschampsia*, Beauv. 63. *Holcus*, Lin. 64. *Trisetum*, Pers. 65. *Avena*, Lin. 66. *Arrhenatherum*, Beauv. 67. *Danthonia*, DC.
- Tribe XI. Chlorideae.—68. *Cynodon*, Pers. 69. *Ctenium*, Panz. (Monocera, Ell.) 70. *Chloris*, Sw. 71. *Trichloris*, Fourn. 72. *Gymnopogon*, Beauv. (Anthopogon, Nutt.) 73. *Schedonnardus*, Steud. 74. *Bouteloua*, Lag. (Eutriana, Trin.) 75. *Eleusine*, Gaertn. 76. *Leptochloa*, Beauv. (Oxydenia, Nutt.) 77. *Buchloë*, Engel.
- Tribe XII. Festucaceae.—78. *Pappophorum*, Schreb. 79. *Cotlea*, Kunth. 80. *Triodia*, Br. (Uralespis, Nutt. Tricuspsis, Beauv.) 81. *Diplachne*, Beauv. 82. *Triplasis*, Beauv. (Diplocea, Raf.) 83. *Eremochloë*, S. Wats. 84. *Phragmites*, Trin. (Arundo, Beauv.) 85. *Monanthochloë*, Engel. 86. *Munroa*, Torr. 87. *Lamarkia*, Moench. (Chrysurus, Pers.) 88. *Cynosurus*, L. 89. *Koeleria*, Pers. 90. *Eatonia*, Raf. 91. *Dissanthelium*, Trin. (Stenochloa, Nutt.) 92. *Catabrosa*, Beauv. 93. *Eragrostis*, Beauv. 94. *Melica*, Lin. 95. *Diarrhena*, Raf. 96. *Streptogyne*, Beauv. 97. *Pleuropogon*, Br. (Lophochlaena, Nees.) 98. *Uniola*, Lin. (Trisiola, Raf.) 99. *Distichlis*, Raf. 100. *Dactylis*, Lin. 101. *Briza*, Lin. 102. *Poa*, Lin. 103. *Graphephorum*, Desv. 104. *Glyceria*, Br. 105. *Festuca*, Lin. 106. *Bromus*, Lin.
- Tribe XIII. Hordeae.—107. *Lolium*, Lin. 108. *Agropyrum*, J. Gaertn. 109. *Hordeum*, Lin. 110. *Elymus*, Lin. 111. *Asprella*, Willd. (Hystrix, Moench. Gymnostichum, Schreb.)
- Tribe XIV. Bambuseae.—112. *Arundinaria*.

NOTES.

1. *Reimaria oligostachya*, Munro, is No. 3566 of Curtiss's Florida plants, ticketed *Paspalum vaginatum*, Sw.
2. *Panicum ignotum* and *P. rufum* of Kunth are now referred to

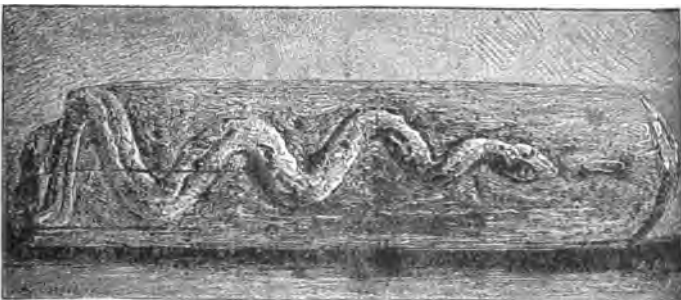
- Anthraenantia*, Beauv. The former is *A. villosa*, Beauv., and the latter *A. rufa*, Benth.
3. *Eriochloa*, HBK., has the right of priority over *Helopus*, Trin. *E. punctata*, Hamilton, is united with *E. polystachya*, HBK.
 4. *Beckmannia*, Host., is placed with the Paniceae after *Eriochloa*.
 5. The genus *Panicum* numbers about 250 species, although over 800 supposed species have been described. Steudel enumerates 850.
 6. *Berchtoldia*, Presl., is united with *Chaetium*, Nees.
 7. *Penicillaria*, Willd., is included under *Pennisetum*, Pers.
 8. *Crypsis schoenoides*, Lam., is *Heleochloa schoenoides*, Host.
 9. *Thurberia*, Benth., is substituted for *Greenia* of Nuttall and *Sclerachne* of Torrey, as both these names had already been taken. *Limnas*, Trin., to which Steudel has referred the species of *Thurberia*, is limited to a single and very distinct species from East-Russian Asia.
 10. *Hilaria*, HBK., includes *Pleuraphis*, Torr.
 11. *Tragus*, Hall., has precedence over *Lappago*, Schreb.
 12. *Rottboellia ciliata*, Nutt., is a species of *Elionurus*, Humb. et Bonpl., very closely allied to if not a variety of *E. ciliaris*, HBK.
 13. *Andropogon melanocarpus*, Ell.—No. 3641 of Curtiss's Florida plants—is a species of *Heteropogon*.
 14. *Sorghum nutans*, *S. avenaceum* and *S. secundum* of Chapman are species of *Chrysopogon*, Trin.
 15. *Oryzopsis*, Mx., includes *Eriocoma* of Nuttall, (the *Fendleria* of Steudel.)
 16. *Muhlenbergia*, Schreb., includes *Vaseya*, Thurber.
 17. *Vilfa* of Beauvois is reduced to *Sporobolus*, Br. The *Vilfa* of Adanson belongs to *Agrostis*.
 18. *Cinna macroura* of the Botany of California is *Epicampes rigens*, Benth.
 19. *Calamagrotis*, Adans., is separated from *Deyeuxia*, from which the species are distinguished by having no prolongation of the rachilla, or "rudiment of a second flower." Their generally tall and almost reed-like habit, together with the ring of long hairs surrounding the flowering-glume, separates them from *Agrostis*. *Calamagrotis longifolia*, Hook., and *C. brevipilis*, Gray, are referred to the genus *Ammophila*.
 20. *Deyeuxia*, Clarion, includes those species in which the rachilla is prolonged into a smooth or more commonly hairy bristle or stipes. *Agrostis aequivalvis*, Trin., is placed in this genus.
 21. *Calamagrotis arenaria*, Roth., is referred to *Ammophila*, Host.—*A. arundinacea*.
 22. *Aira*, L., includes only two North American species—*A. caryophylla* and *A. praecox*, Lin. The other North American grasses which have been included in *Aira* are now referred to *Deschampsia*, Beauv. *Aira danthonioides*, Trin., becomes *Deschampsia calycina*, Presl.
 23. *Eustachys*, Desv., is united with *Chloris*, Sw.
 24. *Chloropsis*, an unpublished genus, is *Trichloris* of Fournier, in his "Enumeration of Mexican Gramineae."
 25. *Lepturus paniculatus*, Nutt., is no *Lepturus* at all but a species of *Schedonnardus*, Steud.

26. *Bouteloua curtipendula*, Gray, is *B. racemosa*, Lagasca.
27. *Dactyloctenium Aegyptiacum*, Willd., is now *Eleusine Aegyptiaca*, Pers.
28. *Leptochloa*, P. B., in North America is limited to *L. mucronata*, Kunth.
29. *Triodia*, Br., includes *Uralespis* and *Windsoria* of Nuttall and *Tricuspis* of Beauvois.
30. *Diplachne*, Beauv., is separated from *Leptochloa*, and includes our *L. fascicularis*, Gray, *L. dubia*, Nees., etc.
31. *Uralespis cornuta*, Ell., and *Uralespis purpurea*, Nutt., are now species of *Triplasis*, P. B.
32. *Stenochloa* of Nuttall is *Dissanthelium* of Trinius.
33. *Catabrosa*, Beauv., is limited to *C. aquatica*, Beauv.
34. *Lophochlaena*, Nees., is made a synonym of *Pleuropogon*, Br.
35. *Brizopyrum*, Link., is now restricted to a few African species. The American grasses which have been included in this genus are now separated under *Distichlis*, Rafinesque.
36. *Atropis*, Rupr., raised to the rank of a genus in the Botany of California, forms a section under *Glyceria*.
37. *Ceratochloa*, DC., separated from *Bromus* in the Botany of California, is again referred to that genus, forming the fourth section.
38. *Agropyrum*, Gaertn., includes *A. repens*, *A. junceum*, *A. caninum*, etc., the genus *Triticum* being restricted to the cultivated wheats, on the one hand, but made to embrace the species of *Aegilops* on the other.
39. *Elymus Europaeus*, Lin., is *Hordeum sylvaticum*, Huds.
40. *Asprella*, Willd., has precedence, from priority, over *Gymnostichum*.

Girard College, Philadelphia.

F. LAMSON SCRIBNER.

Some Phenomena connected with the Cambium-Layer.—The accompanying cut, which we borrow from our French cotemporary *La Nature*, illustrates a singular instance of what the young wood-cells constituting the cambium-layer are capable of accomplishing when a foreign organism chances to be introduced into their midst.



The object represented is a small Brazilian reptile—the jaracaca—which was found within the trunk of an ipé-mirim, a tree of common occurrence in the province of Matto Grosso, to the north of the

Amazons, where the specimen was discovered. The piece of wood containing the reptile, after an examination by the scientists of Rio de Janeiro, was taken to France by Mr. Lopes Netto (Brazilian Minister to the United States) and placed in the hands of Mr. Louis Olivier, who, after a careful study of the specimen, submitted the results thereof to the Botanical Society of France.

"What is astonishing," says Mr. Olivier, in an article on the subject in *La Nature*, "is that the entire body of the snake is lignified,* the anatomical study that I have made of it having shown me that it consists of cells and fibres like those of the secondary wood which surrounds it. It is impossible to explain the fact by saying that there has occurred a formation of these elements in a hollow, which, having been traversed by the animal, has preserved the form of the latter; for on the piece of wood it is not only the contour of the snake that is visible, but, indeed, the whole relief of its body.

Just beyond the head there is likewise observed in relief a small cylinder which appears to represent the larva of an insect. It seems, then, that the snake, in pursuing the latter into a fissure in the tree, has insinuated itself between the wood and the bark into the cambium-layer, which is well known to be the generator of wood and secondary liber. The function of this cambium-tissue is twofold; in the interior it gives rise, in a centripetal direction, to ligneous elements, the youngest of which are consequently found at periphery of the wood; but toward the exterior, on the contrary, it produces, in a centrifugal direction, liber fibres, elongated cells, and prosenchymatous elements, the youngest of which are therefore, situated on the internal surface of the bark. If, then, a foreign body be introduced as far as the external limit of the wood, it will, in a few years, become invested with a series of ligneous layers, which are themselves protected by an abundance of bark. Now, in the case under consideration, not only has there been an investment of concentric zones around the reptile, but, besides this, cells and ligneous fibres derived from the cambium-tissues have been substituted for the elements which constituted the external portions of the snake in measure as these have become absorbed. The places that these occupied have, as they gradually disappeared, been taken by secondary wood, whose hypertrophy is proved by the very relief of the snake's body."

The result, as in cases of petrification, is that in some parts of the body certain delicate details of the animal's organization are clearly visible. This is especially the case with regard to the nostrils and orbits, and to the arrangement of the scales and cephalic plates over the entire half of the surface of the head.†

In connection with this subject Mr. Olivier makes the following statement to further illustrate some of the phenomena connected with the cambium-layer: "About ten years ago a forest was cut down near Elbeuf, one of the trees of which had been a long time before

* Except the centre, in which are found the constituent elements of the animal.

† These details are not shown in our cut, which represents the snake about one-third the natural size.

marked with the letter 'B' to indicate a boundary. This mark had been made, according to custom, with a red-hot iron, which had penetrated the tree to some depth. When the tree was chopped up the mark was still very prominent on the surface of the bark. A blow of the axe given by the woodman parallel with the axis of the trunk, in the external region of the 'sap-wood,' revealed two absolutely plain surfaces, neither of which bore a trace of the letter; but, a second cut, made a little further toward the centre, brought to light a mark 'B' identical with the one presented by the surface of the bark itself." We omit the engraving furnished by Mr. Olivier to illustrate this case, and substitute therefor a cut showing (one-fifth the natural size), an analogous example which was exhibited by Mr. J. D. Hyatt at the September meeting of the Torrey Club. Mr. Hyatt stated that the specimen shown was obtained by Mr. E. C. Morrison in the northern part of Michigan, while making a survey last winter for a railway whose route lay through a section of country entirely covered with forest.



During the progress of his work Mr. Morrison frequently found it necessary to verify certain points of the survey by hunting up the trees showing the nearly obliterated scars made by the Government surveyors many years ago in dividing the country up into townships or "sections." Upon removing the wood-growth which covered the "blaze" made by these surveyors, he found the record in most cases perfectly preserved, while the figures and letters, from being filled in by young wood-cells, were exactly copied in relief (as shown in the cut) upon the inner surface of the succeeding annual layer. The specimen figured, which was taken from a hemlock, does not exhibit a complete record, inasmuch as the entire surface of the "blaze" has not been covered by new wood; but Mr. Morrison obtained other examples in which the record was perfect, the date revealed being 1842, and the layers of growth corresponding exactly with the number of years which has since elapsed.

Floral Proliferation in *Gratiola*.—Mr. E. S. Wheeler has sent us from Berlin, Mass., a number of specimens of *Gratiola aurea*, which have regular flowers, with from two to three corollas enclosed one within the other after the manner of those of the "hose in hose" variety of the primrose (*Primula acaulis*). In some cases the innermost corolla is tubular like the outer ones, but in others it is polypetalous. A vertical section of the flowers shows that the multiplication of the parts is due to median proliferation. Dr. Masters (Vegetable Teratology) gives Scrophulariaceae as one of the orders in which this sort of change is apt to occur.

Mr. Wheeler remarks that in the locality where these specimens were found no flowers were observed last year, and but few this, the plants having been kept cropped by cattle.

Note on the Tuckahoe.—Reading over the notes on tuckahoe in the October BULLETIN, recalls to mind what little I know of it. I have never met with it about Aiken, but many years ago, when I lived in the coast region of the State, I saw specimens frequently.

Most generally they were picked up in plowed ground, brought to the surface by the plow. I have a distinct recollection of finding on an old half-rotted pine rail, buried under the surface, several specimens, five or six in number, of sizes varying from that of a hen's egg or less, to more than double that size. They seemed attached to the half-rotted rail. They were all perfect in growth, that is, they seemed to have attained their full size, and were covered with the usual coarse, rough, brownish bark. Whether or not they derived any nourishment from this matrix to which they were attached, it is impossible to say.

All that I have ever seen, varying very much in size as they did, seemed to have completed their growth. I have never seen them in any intermediate state, or in such condition as to lead me to suppose they were still increasing in size.

Aiken, S. C.

H. W. RAVENEL.

The Canadian Flora.—Botanizing in connection with the meeting of the American Association at Montreal.—Probably the prevailing feeling among botanists at Montreal, from "The States," was one of surprise and disappointment that the Canadian flora was so familiar. At Montreal I noticed nothing of interest either among the weeds or the wild flowers. At Quebec, *Euphrasia officinalis* was abundant on the ramparts. At Tadousac, *Empetrum nigrum* and *Vaccinium Vitis-Idaea* were growing at sea-level, the latter so abundant that children were bringing in pails of the berries for sale.

At Ha! Ha! Bay, where I had intended stopping if the flora seemed attractive, the only unfamiliar plant was *Senecio vulgaris* as an abundant weed.

The meeting next year at Minneapolis will doubtless offer many more botanical attractions to eastern botanists.

Deaf-Mute College, Washington, D. C. J. W. CHICKERING, JR.

Teratological and Other Notes.—(From observations made during 1882).—*Claytonia Virginica*; one specimen with 4 sepals, 9 petals, 9 stamens, 1 style and 4 stigmas. Another with 4 sepals, 10 petals, 8 stamens, 2 styles, and each with 3 stigmas. A third with 3 sepals, 8 petals, 6 stamens, style 1 and the stigmas deformed.

Podophyllum peltatum; four specimens with a single peltate leaf, bearing a flower, the peduncle issuing at about the usual place from a slight depression in the side of the stem. They did not all occur in the same group of plants. Such variable forms are most easily seen just before the leaves expand. Another specimen of the same, otherwise normal, had about 6 sepals, some of them cleft almost to the base; 9 petals, those on one side, as in case of the sepals, larger than on the other; stamens 29; pistils 2, distinct to the base, one about thrice larger than the other, their relative positions corresponding to those of the larger and smaller sepals and petals.

Ranunculus bulbosus; a plant in which all the flowers were at first double, without stamens or pistils; later, the axis was prolonged in each about two inches, and, at its extremity, produced a second similar flower.

Linaria Canadensis; a marked case of fasciation, the stem broadly flattened and about three-sixteenths of an inch wide. Collected at Hammonton, N. J.

Erigeron strigosus having the florets of the heads altered, each producing a secondary head with jointed pedicels that bore a leafy involucre just beneath the joints. The ray-flowers were more conspicuously altered, but this was probably owing only to their earlier development.

Verbena urticaefolia altered similarly to the last. This and the preceding are certainly curious cases of proliferation.

Ilysanthes gratioloides fruiting cleistogamously.

Cirsium lanceolatum.—In BULLETIN No. 4 of the current volume, Mr. W. E. Stone queries respecting a white-flowered form of this plant reported by me last year. I would state that it was a fully-developed specimen as regards size, etc. No plant of that species has appeared at the same place this season.

A hybrid *Verbascum*, found over half a mile from the one reported last year, seems to vary more toward *V. Lychnitis*. I suspect as that one was growing in a group of *V. Blattaria* the latter was the female parent, while this one, found in a group of *V. Lychnitis*, had, on the contrary, the last as female parent. I also observed a *V. Lychnitis* having the branches of the panicle terminating in a rosette of leaves like those of the stem, but smaller.

Concordville, Pa.

WILLIAM TRIMBLE.

Botanical Notes.—*Dimorphic Leaves of Aquatic Plants.*—In the *Comptes Rendus* of the Académie des Sciences (T. xcv., p. 487), a note by Mr. E. Mer is published which throws some light on the curious dimorphic leaves of aquatic *Ranunculi*. He considers that as the petioles of submerged leaves elongate, while the contrary is the case with the floating leaves, it is probable that the petiole absorbs the nutritive matter to the detriment of the limb, the submerged leaves not producing starch and not being capable of transpiration. This does not apply to sessile leaves, since in them there is no disturbance of the nutritive balance, the dimensions only of the leaf being lessened.

Chlorophyll.—The investigations of Pringsheim on the nature and mode of formation of chlorophyll have been gone over by A. B. Frank (*vide Jour. Micr. Soc.*,), and among other interesting results arrived at he concludes that the change of color of leaves in autumn is due to the disappearance of the protoplasm of the cells, in consequence of which the chlorophyll grains come in contact with the acid cell-sap, the result being the change of the green color into yellowish green or yellow, followed by the separation of oily drops of hypochlorin. The same change takes place in fruits and also in leaves which become yellow from want of light. Wiesner regards the protection of chlorophyll from injury as one of the functions of vegetable protoplasm.

Electric Phenomena in Plants.—Some interesting results have been obtained by A. J. Kunkel (*vide Jour. Micr. Soc.*), concerning the various electric phenomena observed in plants. He finds that the leaf-veins are generally positive toward the rest of the leaf, but the direction of the current is reversed if the spot on the leaf where the electrode is placed is wetted before the other electrode is placed on the vein. A spot long moistened is positive toward one freshly wetted. When a plant is bent or wounded the electrode near the bend or wound is negative to the other. Dr. J. Burdon Sanderson has noticed somewhat similar phenomena in the leaf of the Venus's fly-trap (*Dionaea muscipula*), the under surface of the sensitive lobe of the leaf being electro-negative to the upper at the moment that the leaf is irritated; after about half a second the upper surface becomes electro-negative and remains so for some time.

Mummy Garlands.—While Egyptologists of every nationality are congratulating themselves and each other upon the safety of the Boolak Museum, it will not be amiss to note that a priceless addition had been made to the treasures of that famous collection shortly before the breaking out of the late rebellion. Several of the royal mummies discovered last year at Dayr-el-Baharee were, it will be remembered, found garlanded with flowers, these flowers being for the most part in as perfect preservation as the specimen plants in a "Hortus Siccus." M. Arthur Rhoné, in a recent letter to *Le Temps*, has described the extremely curious way in which these garlands are woven. They consist of the petals and sepals of various flowers, detached from their stems, and enclosed each in a folded leaf of either the Egyptian willow (*Salix Safsaf*), or *Mimusops Kummel*, Bruce. The floral ornaments thus devised were then arranged in rows (the points being all set one way) and connected by means of a thread of date-leaf fibre woven in a kind of chain stitch. The whole resembles a coarse "edging" of vegetable lace-work. Among the flowers thus preserved are *Delphinium orientalis*, *Nymphaea caerulea* or *N. Lotus*, *Sesbania Aegyptiaca*, and *Carthamus tinctorius*, so largely employed as a dye by the ancient inhabitants of the Nile valley. The dried fruit, as well as the dried yellow blossom of the *Acacia Nilotica* is likewise present; and mention is also made of the blossom of a species of watermelon now extinct. The foregoing are all interwoven in the garlands in which the mummy of Amen-hotep I. was elaborately swathed. With others of the royal mummies were found fine detached specimens of both kinds of lotus, the blue and the white, with stems, blossoms, and seed-pods complete. Still more interesting is it to learn that upon the mummy of the priest Nebsooni, maternal grandfather of King Pinotem II. (XXIst Dynasty), there was found a specimen of the lichen known to botanists as *Parmelia furfuracea*. This plant is indigenous to the islands of the Greek Archipelago, whence it must have been brought to Egypt at, or before, the period of the Her-Hor Dynasty (B.C. 1100 or B.C. 1200). Under the Arabic name of "Kheba," it is sold by the native druggists in Cairo to this day. These frail relics of many a vanished spring have been arranged for the Boolak Museum with exquisite skill by that eminent traveller and botanist Dr. Schweinfurth.

Classified, mounted, and, so to say, illustrated by modern examples of the same flowers and plants, they fill eleven cases—a collection absolutely unique, and likely ever to remain so. The hues of these Old World flowers are said to be as brilliant as those of their modern prototypes; and, but for the labels which show them to be three thousand years apart, no ordinary observer could distinguish between those which were buried with the Pharaohs and those which were gathered and dried only a few months ago.—*Academy*, Sept. 23rd 1882, quoted by Trimen's *Journal of Botany*.

Botanical Literature.

Symbolae Licheno-Mycologicae. Beiträge zur Kenntniss der Grenzen zwischen Flechten und Pilzen, von Dr. Arthur Minks. Zweiter Theil. 8vo. pp. 273. Kassel u. Berlin: Theodor Fischer, 1882.

This second volume of the laborious work of Dr. Minks is now published, and commends itself to botanists interested in the often undisputedly questionable relations of what have heretofore been taken for discomycetous and pyrenomycetous Fungi to Lichens, as a most carefully elaborated, and wholly new contribution to their history. The difficulty of this author's later writings recurs indeed here, that they presuppose an exceptional ability of microscopical manipulation, and an acquaintance with very minute structure which, in the field he occupies, no one perhaps fully shares with him; but it is not easy to believe that a genuine interest in the plants he investigates (to a considerable extent North American) can be satisfied without estimating the value of his results. The old reverence for species as ideal centres, which it was the naturalist's task to seek amid the boundless luxuriance of difference in nature, has been shaken, to say the least, by the prepossessions engendered by Darwin's thought; and the hosts ever-growing of "n. spp." with which the very existence, as scientific disciplines, of the classes brought together in thallophytal botany is threatened, find but scant opposition; yet surely no one can question that a competent and sincere attempt to exhaust the structural history of an obscure organism is worth vastly more than any diagnosis of it. That is no sufficient estimate of the systematist's toils which would reduce their result to a mere ticketing of natural objects, the largely accidental and arbitrary character of which work, in whatever hands, can only be relieved in so far as it is possible to confine it to the most experienced inquirers, to be accepted, in good part no doubt blindly, by the rest. But is there not more than this in the study of the system of nature? And can such study be really scientific if it content itself without taking account of the observations and results, and the criticism of genera and species of so honest and thorough-going, whether or not now, like all others mistaken an investigator as Minks?—E. TUCKERMAN.

SERIAL PUBLICATIONS.

Proceedings of the Davenport Academy of Science. Vol. iii., Part ii. (August.)—'Contributions to the Flora of Iowa,' by J. C. Arthur; 'Two new Species of *Oxytheca*' (*O. caryophylloides* and *O. Parishii*), by C. C. Parry.

Grevillea (September).—‘Monograph of the British Hypomycetes’ (2 plates), by C. B. Plowright; ‘On the Heteroecism of the Uredines,’ by C. B. Plowright; ‘New British Fungi,’ by M. C. Cooke; ‘Fungi Macowaniana,’ by C. Kalchbrenner; ‘Australian Fungi,’ by M. C. Cooke; ‘Three new Indian Fungi,’ by M. J. Berkeley.

Proceedings of the Torrey Club.—The regular meeting of the Club was held Tuesday, Sept. 12th, the President in the chair and twenty-five persons present.

Mr. Hollick exhibited and remarked upon some sports in ferns, and a specimen of *Lilium Philadelphicum* in which one of the stamens was replaced by a sepal; and also showed a specimen of *Hepatica* in which the involucre was excessively developed.

Mr. Britton remarked upon some recent additions to the flora of New Jersey, and called attention to some new stations for a few of the rarer forms.

Heterophylly in the Beech.—The President showed specimens of two forms of leaves taken from a beech-tree, one of them being normal and the other deeply incised like those of the variety *incisa* of arboriculturists.

Mr. J. D. Hyatt exhibited a section of the bark and wood of a hemlock, showing on the inner surface of the wood reversed copies in relief of marks made on the tree by surveyors forty years ago. (Described more in detail on another page).

Mr. Schrenk remarked upon the plants found by him during the summer on Mt. Washington.

Dr. Barstow extended an invitation to the Club to visit his residence at Flushing on the 16th to partake of a luncheon.

Two names were proposed for active membership,

At the regular meeting of the Club held Tuesday evening, Oct. 10th, the President occupied the chair and fourteen persons were present.

In the absence of the Librarian, Mr. Gerard read the titles of the books and periodicals which had been sent to the Club since the previous meeting.

The President exhibited a small but tastefully arranged collection of Pacific coast algae, mounted on very large cardboard, a gift from Dr. G. W. Hulse to the Torrey Herbarium. Among the specimens included was one of *Nereocystis luetarum* 60 feet in length. The President in showing the collection made some interesting remarks on the characteristics and economic uses of the plants represented.

A late-flowering Shrub.—Mr. Bower showed some specimens, from his garden, of *Staphylea trifolia*, L., bearing both fruit and flowers.

Dr. Geo. Vasey, of the Agricultural Department, being present, read upon invitation a paper on ‘Three Hybrid Oaks near Washington,’ which will be published in a future number of the BULLETIN.

Three persons were elected active members.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. IX.]

New York, December, 1882,

[No. 12.]

Note on *Holozonia filipes*.

By EDWARD LEE GREENE.

While my recent account of this interesting plant was in press, I was unexpectedly favored with an opportunity of visiting both of the localities whence my specimens had been derived. The fuller knowledge thus obtained calls for some alteration in the character printed in the October number of this journal. The pappus is found to be extremely variable, and that of the disk-flowers often wanting altogether. But the constant presence of that of the ray-akenes, taken with the great number of flowers in the head (thrice as many as in *Lagophylla*), the perennial root and opposite leaves unite to form a generic type as distinct from *Lagophylla*, on the one hand, as from *Hemizonia* on the other. The following will be found a more satisfactory and complete description than that given on page 122 of this volume:

HOLOZONIA, Greene, *l. c.*

Head heterogamous, with 6-8 pistillate, fertile rays, and 16-20 hermaphrodite but sterile disk-flowers. Involucre of as many herbaceous scales as there are ray-flowers, each scale completely and closely enfolding its obovate-oblong, obcompressed, smooth akene. Receptacle small, flat; its chaff united into a 10-12-toothed cup enclosing the disk-flowers. Corollas white; those of the ray purplish outside, deeply cleft into 3 linear divisions, open all day; those of the disk 5-lobed. Pappus of the ray a hyaline saucer-shaped crown, whose margin is either entire, or sharply toothed, or beset with short bristles; of the disk, two or more long, extremely slender, deciduous bristles, with a more or less chaffy-dilated base, sometimes reduced to one or more minute scales, often wholly wanting.

HOLOZONIA FILIPES, Greene, *l. c.*—Perennial, spreading by numerous creeping rootstocks; stems 2 ft. high, simple below, above diffusely paniculate; leaves linear, entire, those on the lower half of the stem all opposite, sessile, soft-villous; those of the branches alternate, much reduced in size, glandular; heads on slender pedicels, closely resembling those of *Hemizonia luzulaefolia*. Abundant along mountain streamlets east of Napa Valley, California; its rootstocks imbedded among stones, even in the midst of running streams; flourishing from May to November.

A List of Grasses collected by Mr. C. G. Pringle in Arizona and California, with descriptions of those species not already described in American publications.*

47. *Deyeuxia varia*, Kth. (*Calamagrostis*, DC.)

Mountains about the head-waters of the Sacramento River. Alt., 5,000 ft. August.

* Continued from page 105.

This grass is referred to *Deyeuxia varia*, Kth., with some hesitation, no authentic specimens being at hand for comparison; but there is little of importance in the description of that species to exclude it. Kunth's characters, where he says: "*pilis corollam aequantibus vel duplo brevioribus* ; *arista dorsali geniculata, calycem vix excedente*," describe it exactly.

It differs from *D. sylvatica* in its taller and more slender habit, shorter and less acuminate empty glumes, shorter awns and longer palea, which is similar in texture to its glume. From *Deyeuxia stricta*, as described by American authors, it differs in its twisted and geniculate awn, shorter and more scanty basal hairs and larger and firmer palea.

It is very near No. 3 of Bolander's small collection, and 1,089 of Kellogg & Harford, and appears to be identical with one of the forms (there are two forms among the specimens in hand) included under No. 653 A. of Powell's collection, 1868.

48. *Deschampsia elongata*, Munro, in Benth. Plant. Hartweg, 342; *Aira elongata*, Hook., Fl. Bor. Am., ii., 243. t. 228; Thurber, Bot. Cal., ii., 297.

Strawberry Valley, California. August.

49. *Trisetum canescens*, Buckley, Proc. Acad. Phil., 1862, p. 100; Thurber, Bot. Cal., ii., p. 296.

Mt. Shasta. Alt., 6,000 ft. August.

50. *Trisetum subspicatum*, Beauv. Thurber, Bot. Cal., ii., p. 296

Mt. Shasta. Alt., 7,500 feet. August.

51. *Avena fatua*, Linn. Thurber, Bot. Cal., ii., 295.

Santa Cruz Valley, near Tucson.

This grass is occasionally found on the "ballast" grounds at Philadelphia.

52. *Danthonia Californica*, Bolander, Proc. Cal. Acad., ii., 182; Thurber, Bot. Cal., ii., p. 294.

Mountains about the head-waters of the Sacramento River. Alt., 7,000 feet. August.

53*. *Chloris alba*, Presl. Vasey, Bot. Wheeler Exped., p. 288; Torrey, in Emory's Report, etc.

Santa Cruz Valley, near Tucson, Arizona. June.

54. *Trichloris* (?) *Blanchardiana*, Fournier. *Chloridiopsis Blanchardiana*, J. Gay, in herb.

Culms stout and leafy, about 2 ft. high; sheaths compressed, keeled, hairy on the edges, especially near the throat; upper surface of the conduplicate leaf hairy near the base. Spikes slender, numerous—a dozen or more—3-4 in. long, arranged in a terminal fascicle. Spikelets with one 3-awned perfect flower and a stipitate, 3-awned rudiment. A second rudimentary floret is sometimes present.

Santa Cruz Valley, near Tucson. May.

This grass has been distributed in herbaria as *Chloropsis* or *Chloridiopsis Blanchardiana*, Gay, and is so named in Pringle's sets. The generic name here adopted is based upon the following note in Bentham's 'Notes on Gramineae:' "The genus *Trichloris*, Fournier, comprises two Mexican and two extra-tropical South American species. They resemble *Trisetaria* in the dense oblong crinate

panicle and their 3-awned flowering-glumes; but the panicle is composed of simple crowded verticillate spikes, and the spikelets, sessile in two rows on the rachis, with one to three empty awned glumes above the flowering one, are quite those of *Chloris*. The two Southern species have long been indicated and named in herbaria as constituting an independent genus (the one by J. Gay, the other by Munro); but never having been published, we must adopt Fournier's generic name for the whole." We are in doubt as to the specific name applied to this grass by Fournier, and, in the uncertainty, *Blanchardiana* is retained.

55. *Bouteloua hirsuta*, Lagasca Gray, Man., 5th ed., p. 621; *Chondrosium hirtum*, HBK., Nov. Gen. i., 176. t. 59.

Mesas, near Camp Lowell.

56. *Bouteloua polystachya*, Torr., var. *major*, Vasey, in Bot. Wheeler Exped., p. 287.

Mesas, near Camp Lowell. July.

This is a robust form, with leafy, branching culms 2 ft. long, bearing numerous spikes, which are nearly an inch in length. It differs much in habit from No. 403 and No. 1,356 of E. Palmer's collections of 1875 and 1880, which resemble the figure of *B. polystachya*, Torr., in Pac. R. R. Survey, v., pl. 10. The minute characters of the spikelets, however, differ so little that there appears to be no reason for regarding this grass other than a large form or variety of that species.

57.* *Bouteloua Humboldtiana*, Griseb., Pl. Wright., 532; *Eutriana juncifolia*, Kth., Gram., i., 95; *B. juncifolia*, Vasey, in Bot. Wheeler Exped., p. 287; non Lagasca.

Mesas, near Camp Lowell. July.

58.* *Bouteloua aristidoides*, Thurber, Bot. Cal., ii., p. 291; *Dinebra aristidoides*, HBK., Nov. Gen. Pl. i., 171. t. 695.

Mesas, near Camp Lowell. June.

This is the grass doubtfully referred to *B. gracilis*, Hook. f., in Bot. Wheeler Exped., p. 287, and it is distributed in Pringle's sets under this name.

59.* *Leptochloa mucronata*, Kth., var. *PULCHELLA*, n. var.—Culms slender, tufted, erect, 5-10 in. high (including panicle); leaves $\frac{1}{2}$ -1 in. long and a line wide; panicle erect, spikes $\frac{1}{2}$ -1 in. long.

Santa Cruz Valley, near Tucson. July.

This little grass is so distinct in appearance from the ordinary forms of the species, with their stout culms, elongated and usually wide ($\frac{1}{2}$ in.) leaves, and spikes from 2-5 in. long, that it is ventured as a variety. I should be more inclined to think that the special characters of the plant resulted from peculiarities of climate and soil had I not the ordinary form of the species from the same region.

60. *Pappophorum boreale*, Ledeb., Flor. Ross., p. 404; *P. phleoides*, Turcz. It is 947 of Parry and Palmer's coll., 1878; 1,361 of E. Palmer, 1880, and 2,029 of Wright's N. Mex. coll., 1851-2.

Mention is made of this grass by Dr. Torrey in the Pac. R. R. Rept., Vol. iv., where he states that it agrees so well with authentic specimens of *B. phleoides* received from Fischer that he can hardly regard it as even a variety.

The above name is here adopted out of deference to our best American authorities, but the description of *P. nigricans*, Br., in *Flora Australiensis*, quoted below, defines the essential characters of our plant so well, that, guided by the description alone, I should scarcely hesitate to refer it to that species. I have examined two forms of *P. nigricans* from Australia, one of which has nearly the habit as our plant.*

"*Pappophorum nigricans*, Br. Stems a foot to a foot and a half high; leaves flat or convolute, usually narrow, sometimes quite setaceous, glabrous, pubescent or villous; the nodes glabrous or bearded. Panicle dense and spike-like, varying from ovoid to oblong and under one-half an inch long, to narrow cylindrical and 3 in. long, or broader and more branched and 2 to 3 inches long, but always dense, pale or dark colored. Outer glumes varying from one to rather above two lines long, obtuse or acute, striate with usually 7-9 nerves, but sometimes, especially on the lowest glume, reduced to five, and two of these short. Flowering glume not above a line long, more or less hairy outside, especially at the base, with 9 fine, spreading, plumose awns varying from the length of the glume to twice as long. Above the flowering-glume and enclosed in it, is usually a similar smaller one with a male or rudimentary flower, and one or two still smaller empty ones."—*Flora Australiensis*, Vol. vii., p. 600.

61.* *Pappophorum apertum*, Munro in herb. Benth.(?).—Culm 1-2 ft. high, erect, branched at the base. Panicle, 6-8 inches long, contracted and spike-like, densely flowered, interrupted below and at first more or less enclosed in the upper sheath. Outer glumes about two lines long, the lower a little shorter, oblong or ovate lanceolate, obtuse and two-lobed or notched at the tip. Flowering-glumes 2-4, with 2 to 3 stipitate rudimentary florets above, about a line and a half long and nearly as broad, convex and coriaceous, hirsute below on the dorsal and lateral nerves, otherwise smooth; awns 10-15, those appearing as continuations of the nerves of the glume, stouter and longer (2 lines) than the intermediate ones.

Mesas, near Camp Lowell, Arizona.

This grass is the same as No. 1,360 of E. Palmer's Mexican collection, 1880, which is enumerated in the Kew list of Palmer's plants as "near *P. laguroideum*, Schrad. Grisebach, in *Flor. Br. W. Ind.*, p. 537, has followed Trinius in uniting Schrader's species with *P. alopecuroideum*, Vahl. Pringle's specimens were at first referred to the the last-named species from the correspondence in habit and inflorescence to the descriptions by Steudel and by Grisebach; but I have since been able to compare Pringle's specimens with the West Indian

* PAPPOPHORUM, Schreb.—Panicle contracted and spike-like. Spikelets with 2-4 flowering glumes, the lower perfect, the upper smaller and sterile. Empty glumes two, membranaceous, awnless, exceeding the flowering glumes, the lower one shorter. Flowering glume membranaceous subelliptical 9-13 awned, awns straight, subulate continuous with the glume; palea longer than its glume, bicarinate. Stamens 3, rarely 2. Ovary smooth. Styles 2, terminal. Stigmas plumose with denticulate hairs. Scales 2, truncate, smooth. Grain smooth, enclosed by the palea, free.—Kunth.

plant, and although there is a resemblance between the two, especially in the inflorescence, the latter is more robust in habit, has narrower and acuminate-pointed outer glumes, and, so far as examined, but one perfect flowering-glume, which is one-half smaller, with longer and more slender awns. So far as the spikelets are concerned there is a close similarity between Pringle's grass and No. 803 of C. Wright, collected in Western Texas in 1849, and ticketed *P. apertum* by Genl. Munro in herb. Bentham, and *P. vaginatum* by Mr. Buckley in herb. Phila. Acad. I fail to detect the slightest difference between the spikelets of No. 803 of C. Wright and No. 1,362 of Palmer's Mexican collection. Between these and Pringle's grass, or the No. 1,360 of Palmer, the difference is more apparent than real, and exists in those characters which are most subject to variation. The culm is rather stouter, the panicle may be a little longer and is more densely flowered and lighter colored, also the spikelets usually have fewer perfect flowers, but in all other essential points they are alike. Should Pringle's grass prove a good variety of No. 803 of C. Wright, which its habit would seem to indicate, Buckley's name might be adopted to designate it, as it is in a measure descriptive.

Girard College, Philadelphia.

F. LAMSON SCRIBNER.

Flora of Richmond Co., N. Y.—ADDITIONS AND NEW LOCALITIES, 1880-1882.

Ranunculus aquatilis, L., var. *trichophyllus*, Chaix. Abundant in Clove Lake Swamp; has appeared spontaneously since last year.

Dentaria laciniata, Muhl. Woods near New Dorp. (Miss C. O. Thompson).

Brassica campestris, L., West New Brighton. Introduced in ballast. Also occasional in old fields.

Brassica rapa, L. Occasionally spontaneous in cultivated fields.

Ascyrum Crux-Andree, L. Kreischerville.

Vaccaria vulgaris, Host. Tompkinsville. (Miss C. O. Thompson.)

Silene inflata, Smith. New Dorp. Rare.

Stellaria longipes, Goldie. Abundant near Port Richmond.

Stellaria uliginosa, Murr. Rossville. Rare.

Sagina decumbens, T. & G. Roadsides near Woodrow.

Sagina decumbens, T. & G., var. *Smithii*, Gray. Garretson's. Rare.

Gypsophila arvensis, L. New Brighton, in gardens and waste-places. Rare. Introduced.

Malva moschata, L. A single plant near Court House. 1880.

Zanthoxylum Americanum, Mill. Port Richmond.

Rhus typhina, L. Richmond Hill.

Medicago sativa, L. West New Brighton. Introduced in ballast.

Desmodium Canadense, DC. Clove Lake.

Tephrosia Virginiana, Pers. Common around Tottenville.

Prunus Mahaleb, Linn. Escaped to roadsides near Garretson's. Rare.

Prunus Cerasus, L. Thoroughly established in woods and copses, probably through the agency of birds.

Pirus communis, L. Sparingly established in woods and borders of fields.

- Amygdalus Persica*, L. Along old stone walls and open woods.
- Amelanchier Canadensis*, T. & G., var. *rotundifolia*, Gray. Prince's Bay.
- Sedum ternatum*, Michx. Roadsides near Woodrow. Rare.
- Aethusa Cynapium*, L. Near Clove Lake. Rare.
- Carum Carui*, L. Roadsides near Four Corners.
- Symphoricarpus vulgaris*, Michx. Roadsides and waste-places near gardens (escaped).
- Lonicera Tartarica*, L. Roadside near Huguenot; escaped from gardens.
- Viburnum nudum*, L., var. *cassinoides*, Gr. Swamps near Watchogue.
- Galium trifidum*, L., var. *pusillum*, Gr. Near Pleasant Plains. Rare.
- Oldenlandia glomerata*, Michx. Not rare at Tottenville.
- Fedia olitoria*, Vahl. Streets of West New Brighton. Rare. (Miss Webster.)
- Eupatorium album*, L. Common at Tottenville.
- Solidago puberula*, Nutt. Not rare at Watchogue.
- Matricaria Chamomilla*, L. West New Brighton. Introduced in ballast.
- Artemisia biennis*, Willd. Rather plentiful near Clove Lake.
- Serratula tinctoria*, L. West New Brighton. Probably introduced in ballast.
- Senecio aureus*, L., var. *obovatus*, Gray. Near Richmond.
- Helianthus strumosus*, L. Near Clove Lake.
- Helianthus decapetalus*, L. Near Clove Lake.
- Lysimachia thyrsiflora*, L. Linden Park Swamp.
- Mimulus alatus*, Ait. Along a brook near Huguenot.
- Galeopsis Ladanum*, L. "Staten Island." BULL. TORR. BOT. CLUB, vi., p. 115.
- Perilla ocimoides*, L., var. *crispa*, Gray. "Escaped to roadsides near Huguenot." (W. H. Leggett, in BULL. TORR. BOT. CLUB, ii., 29.)
- Echinopspermum Lappula*, Lehm. West New Brighton. Introduced in ballast.
- Cynoglossum officinale*, L. One plant near Concord. 1880.
- Cuscuta compacta*, Juss. Tottenville.
- Solanum Carolinense*, L. Waste-places and roadsides, New Dorp and New Brighton.
- Physalis angulata*, L. New Dorp. Abundant in one field.
- Nicotiana rustica*, L. One plant near Clove Lake. 1880.
- Aristolochia Serpentina*, L. Tottenville. (Herb. W. H. Leggett.)
- Rumex orbiculatus*, Gray. Clove Lake Swamp.
- Callitriche Austinii*, Engelm. Tottenville and top of Ocean Terrace.
- Croton capitatus*, Michx. Streets of New Brighton. (Miss C. O. Thompson.)
- Cannabis sativa*, L. West New Brighton. Common. Introduced in ballast.
- Potamogeton pauciflorus*, Pursh. "Near Quarantine." (W. H. Leggett.)
- Sisyrinchium Bermudiana*, L., var. *mucronatum*, Gray. Tottenville.
- Smilax tamnoides*, L. "Staten Island, one plant only." (T. F. Allen. 18th Annual Rept. State Cab. Nat. Hist., p. 202.)
- Helonias bullata*, L. In a maple swamp near Kreischerville.

- Eleocharis melanocarpa*, Torr. New Springville and New Dorp.
Scirpus planifolius, Muhl. Tottenville and Garretson's.
Scirpus sylvaticus, L. Near Garretson's.
Scirpus Eriophorum, Michx., var. *laxus*, Gr. Near Richmond.
Carex triceps, Michx. New Dorp.
Carex Muhlenbergii, Schk., var. *enervis*, Boott. (W H. Leggett, in
 BJLL. TORR. BOT. CLUB, vi., 9.)
Carex rosea, Schk., var. *radiata*, Dew. Near Garretson's.
Carex utriculata, Boott. Linden Park Swamp.
Carex canescens, L. Common.
Agrostis spica-venti, L. West New Brighton. Introduced in ballast.
Phalaris arundinacea, L., var. *picta*, Gr. Thoroughly established
 along a brook near Four Corners.
Poa nemoralis, L. West New Brighton. Introduced in ballast.
Poa serotina, Ehrh. West New Brighton. Introduced in ballast.
Festuca nutans, Willd. Hills back of Garretson's. Not common.
Festuca ovina, L., var. *duriuscula*, Gray. Near Garretson's.
Bromus multiflorus, Smith. West New Brighton. Introduced in
 ballast.
Bromus mollis, L. New Dorp. Not common.
Panicum Crus-galli, L., var. *hispidum*, Gr. Common on the salt
 marshes.
Polypodium vulgare, L. Sparingly near Silver Lake, Four Corners,
 Richmond, and top of Ocean Terrace.

ARTHUR HOLLICK
 N. L. BRITTON.

A New Variety of *Carex riparia*, Curtis.—Specimens of *Carex riparia*, Curtis, were sent to me in 1881 from Dallas, Texas, by Mr. J. Reverchon, who has just sent me more of the same plant collected in the spring of 1882. It differs enough from the typical form to be considered a variety. Its perigynia are larger and smoother, less flattened—being nearly cylindrical—and with a beak very much larger than that in the typical form. The nerves of the perigynia are *inconspicuous* and *impressed*, especially below the middle, and the plant may very properly be called *Carex riparia*, Curtis, var. *IMPRESSA*. I have the same plant from Nebraska, with *loosely fruited* spikes. The Texas plant is closely fruited.

Penn Yan, N. Y.

S. H. WRIGHT.

Proliferation in the Carrot.—One of the most unusual departures from the normal condition which I met with this season was in the flowering of a wild carrot. The flower-stalk had been mown off in the summer and several new ones had been thrown up from near the base, flowering again in October. All were normal but one. In this, the central umbellule, which, as we know, is usually the weakest of the whole, in this instance had developed into a strong stalk 2 in. long, bearing another umbel; and from this the central umbellule had again developed to another umbel, though not in flower at the time of gathering. In other words, there were two series of verticils beneath the terminal umbel. This, I fancy, must be a very

rare teratological specimen, and it will be preserved in the herbarium of the Academy of Natural Sciences of Philadelphia.

Germantown, Pa.

THOMAS MEEHAN.

Parmelia furfuracea used in Embalming.—In the note on "Mummy Garlands," in the November number of the BULLETIN, mention is made of the identification of *Parmelia* (*Evernia*) *furfuracea* among the plants of the royal coffins. But this lichen was found in an Egyptian coffin many years ago, and identified by Prof. Tuckerman. I quote from an article on the Flora of the White Mountains by J. W. Dawson in the *Canadian Naturalist* for April, 1862, page 88:

"Not long ago we unrolled in Montreal an Egyptian mummy preserved in the oldest style of embalming, and found that, to preserve the odor of the spices, quantities of a lichen (*Evernia furfuracea*) had been wrapped around the body, and had no doubt been imported into Egypt from Lebanon or the hills of Macedonia for such uses. Yet the specimens from this old mummy were at once recognized by Professor Tuckerman as identical with this species as it occurs in the White Hills and on Katahdin, in Maine."

New Bedford, Mass.

H. W.

The Lignified Snake.—I have seen the original of the famous "snake lignification" from Brazil, and I possess an electrotpe from it, given to our Museum by His Excellency the Brazilian Minister. I am convinced there is no snake in the case. I cannot take the time at this moment to give the two credible explanations which suggest themselves. But I shall be much surprised if the Botanical Society of France is found to endorse the account of M. Olivier in *La Nature*.

Cambridge, Mass.

A. GRAY.

Ilex with Yellow Berries.—Prof. John Robinson sends me from Essex Co., Mass., a sprig of *Ilex verticillata* with bright yellow berries.

Providence, R. I.

W. W. BAILEY.

The Tuckahoe.—The articles in the BULLETIN on tuckahoe, the "Indian bread," have induced me to look up a specimen which I obtained at Asbury Park, some seven or eight years ago. It was got when cutting down some trees and removing the roots. The specimen was found, I should think, about eighteen inches from the surface, in yellow ferruginous sand, and encircling the root of an oak, the root being five-eighths of an inch thick. The specimen is six inches long, and two inches at its thickest part. It has a brown epidermis, and looks wonderfully like a baked sweet potato. The interior flesh or pectine presents exactly the appearance of white flour after being mixed with water and thoroughly dried. It is very hard. I published in the local paper at the time a description under the title: "Tuckahoe, or Indian-bread."

A fact not published is this: In 1862, when taking out the stump of a willow-oak (*Quercus phellos*) from my garden at Keyport, N. J., I found among the roots quite a quantity of tuckahoe; several speci-

mens, I should think enough to fill a quart solid. It was soft, and inside had the color and consistency of stiff starch when cold. This, too, was in yellow ferruginous sand.

Freehold, N. J.

S. LOCKWOOD.

Preservative for Fungi.—Three years ago I invented what I think a very good and cheap liquid for the preservation of fungi, composed of the following ingredients: $4\frac{1}{2}$ ounces of common salt; 5 ounces of pulverized alum, and 1 quart of white wine vinegar. Mix thoroughly and keep in a wide-mouthed glass jar. Brush off any dirt that clings to the fungus, and drop the freshly gathered plant into the liquid.

I have beside me a large jar of plants that were collected in the summer of 1879. They are now in a perfect state of preservation. They have diminished somewhat in size, but their structure is preserved, and the larvae are effectually destroyed. The liquid often gets filled with sediment and floating particles, to free it from which I pour it off, strain it through a piece of thin muslin and return it to the plants.

Baltimore, Md.

MARY E. BANNING.

Note on Grasses.—In a letter just received from Dr. Bentham he states that *Polypogon* is restored to its former place in Agrostideae.

I will add to my notes in the November BULLETIN that *Lepturus paniculatus*, Nutt., is a *Schedonnardus*, Steud., and follows *Gymnopogon*. *Lepturus Bolanderi*, Thurb., is, I think, a true *Lepturus*, R. Br., and follows *Triticum*.

Philadelphia.

F. L. SCRIBNER.

Botanical Notes.—*An Electrified Lily.*—During a storm at Montmaurin, in the Upper Garonne, says *La Nature*, M. F. Laroque witnessed a curious electric phenomenon. Looking toward a clump of lilies, he saw the highest immersed in a diffused violet light, which formed an aureole around the corolla. This light lasted for eight or ten seconds. After it had ceased, he approached the lily and found, to his great surprise, that it was wholly deprived of its pollen, while the neighboring flowers were covered with it.

Night-closing in the Leaves of Purslane.—Mr. Meehan notes (*Proceedings Philada. Acad. Sci.*) that, in the list of plants having diurnal or nocturnal motion, *Portulaca oleracea* does not appear. At sundown the leaves, at other times at right angles with the stem, rise and press their upper surfaces against it. The morning expansion begins with dawn, and soon after sunrise the leaves are fully expanded. Mr. Isaac Burk has observed the same thing not only in *Portulaca*, but also in an allied plant of the West Indies, *Talinum patens*.

Rhus cotinoides.—Since its discovery by Nuttall, in the year 1819, in Arkansas, and twenty-three years later by Prof. Buckley, in North Alabama, *Rhus cotinoides*, Nutt., has not been found by any other botanist, and our knowledge of it has remained fragmentary and obscure.

After having been lost to the botanical world for fully forty years,

the tree has recently been re-discovered by Mr. Charles Mohr, who made it a special object of his research in his investigations of the forest growth of the Gulf region for the tenth census. Mr. Mohr found the tree growing scattered along one of the rocky ravines that traverse the terrace-like shelves of limestone on the southern declivity of the Cumberland Mountains, as they descend upon the valley of the Tennessee River, in Madison County, Ala. The specimens found here ranged from 25 to 35 ft. in height. The largest one felled measured 35 ft. in length and 12 in. in diameter one foot above the ground.

"Arrived at such dimensions," says Mr. Mohr, in a paper on the subject in the *Proceedings* of the Philadelphia Academy of Natural Sciences, "the tree has evidently long passed the best period of its life, judging from the decay by which, more or less, the trunk was found affected. No sign of a decline, however, could be observed in the vigor of its vegetation.

"The trunk divides at a height of from 12 to 14 ft. above its base; the primary limbs are erect, the secondary branches widely spreading, often slightly reclining, smooth, and divide into numerous divaricate reddish branchlets, rugose from the base of the leaf-stalks of the previous season. The bark is rough, covered with a whitish gray epidermis of a deep chestnut-brown underneath, and exfoliating in oblong square scales of uniform size. The inner bark is white, exposed to the air turning rapidly to a deep yellow color, and exudes, when bruised, a resinous sap of a heavy, disagreeable terebinthinous odor. The wood is heavy, very compact, of a fine grain; the white sap wood of small proportion surrounds, as a narrow ring, the deep yellow hard wood, variegated by zones of different shades of brown, imparting to it a beautiful appearance when polished. * * *

"The inner bark and wood are used for dyeing yellow, and it is said, also, for the production of purple tints. On this point, however, no definite information could be obtained.

"Large numbers of trees were cut down during the war to procure a dyestuff much valued at the time, and full-grown ones are now quite scarce near the settlements. On account of the beauty of its wood, the tree is called shittim-wood by the negroes, they believing it to be the same which was used in the construction of the tabernacle in Solomon's Temple. The wood permits of the finest finish; the fineness of its grain, beauty of color and its hardness fit it well for inlaid work, veneering, and the manufacture of smaller articles of all kinds of fancy woodwork.

"As an ornamental tree it far surpasses the European species, and will be found quite as hardy."

As observed in Alabama, the tree appears to be principally confined to the southern declivity of the mountains, from the northern border of the valley of the Tennessee, and strictly to the habitat above mentioned. It was not found on the sandstone cliffs which, but a short distance higher up, overlie the limestone strata, nor lower down the mountain sides, where the soil was deep and rich.

As its wood is used for fuel whenever accessible, the tree would rapidly become extinct within these narrow limits, were it not for its

production of rapidly-growing sprouts to form a copious second growth.

Botanical Literature.

A Dictionary of Popular Names of Plants which furnish the natural and acquired Wants of Man in all Matters of Domestic and General Economy, their History, Products and Uses. By John Smith, F.L.S. London : Macmillan & Co.

The scope of this work is sufficiently indicated by the title which we give in full. It is only necessary to add that the plants treated of are arranged alphabetically under their English names, as far as such exist, followed by their systematic names (according to Lindley's system) and a compact statement of their history, characteristics, products and economic uses. Mr. Smith has enjoyed unexceptional facilities for obtaining information on the subjects of which his book treats, inasmuch as he has been officially connected with the Kew Gardens for upwards of forty years, and was assistant to the late Sir W. Hooker in establishing and arranging the Kew Museum of Economic Botany.

The work abounds in information of the most valuable and interesting character, and will prove very handy as a work of reference to every one who takes an interest in the vegetable kingdom.

The Woody Plants of Ohio, arranged under their appropriate Botanical Orders, with Remarks upon their Uses, Qualities and Sources. By John A. Warder, M.D., assisted by David L. James and Joseph F. James. 8vo. pamph. pp. 40.

In this paper, which was presented at the meeting of the Agricultural Convention of Ohio, in Columbus, January, 1882, the author and his assistants have aimed to provide the farmers of Ohio with a reference-list giving the names, relations, habits and uses of the woody plants of the State. The plants are enumerated in the order in which they occur in Gray's Manual; and the names of many are included in the list which, though insignificant from their diminutive size, "are still useful in the arts, or fill an important office in practical forestry as nurse-plants and as undergrowth, or even as 'ground herbage' among the more noble and valuable Trees of the Wood."

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College, Tuesday evening, November 14th, the President in the chair and twenty-six persons present.

The Librarian reported on the books and pamphlets received since last meeting.

Field Excursions.—Prof. Day, in behalf of the Field Committee, read a report on the field excursions that had taken place during July, August and September.

Adhesion.—Mr. Wilber exhibited a section of a hemlock in which one of the branches had curved inward and become, at its extremity, fused with the trunk. Mr. Britton described and illustrated a case of adhesion between the branches of two maples that had been observed by him recently at Mt. Clair Heights, N. J.

Virescence in the Rose.—A specimen was shown by Mr. Braman of what is popularly called a "green rose"—a condition of the

flower in which chlorophyll is substituted in the petals for the usual coloring matter.

Mr. N. L. Britton presented "Notes on the Autumn Flora of Southern Wyoming and Eastern Colorado," illustrated by specimens of the more common and striking plants noticed in that country in September and October. The most prominent feature observed by Mr. Britton in the Flora of Wyoming along the line of the U. P. R. R. was the very general absence of trees, the only species seen being *Pinus flexilis*, James, and *Juniperus occidentalis*, Hook., both occurring sparingly, and a few willows and cottonwoods along Green and Bear Rivers. The common shrubs of Southern Wyoming were *Artemisia tridentata*, Pursh., the most common sage west of Rawlins, known as "mountain sage" and used as a remedy for mountain fever; the "grease-wood," *Obione canescens*, Moq., *Rosa blanda*, Ait., *Spiraea dumosa*, Nutt., *Berberis aquifolium*, Pursh., and *Symphoricarpos occidentalis*, R. Br.

Among the more common herbaceous plants were noticed *Bige-
lovia* (*Lynosyris*) *graveoleus*, Gray, as very abundant; *Opuntia Mis-
souriensis*, DC.; *Cleome integrifolia*, T. & G.; *Ranunculus Cymbalaria*,
Pursh.; *Glycyrrhiza lepidota*, Nutt., with its prickly legumes; *Lupinus
argenteus*, Pursh, var. *argophyllus*, Watson; and *Chenopodium album*, L.

The tree flora of the foot-hills in Eastern Colorado was found to be much more abundant than that of Southern Wyoming. *Pinus ponderosa*, Dougl., known as yellow pine, was very plentiful, and attained there a height of 80 to 100 ft., and was a very valuable timber tree. *Pinus edulis*, Engelm., the "piñon" of the Mexicans, was a small tree extending as far north as Colorado Springs; *Juniperus Vir-
giniana*, L., was occasional; *Abies Douglasii*, Lindl., was quite plentiful at middle elevations, attaining a height of 75 ft., and known as "swamp pine;" the narrow-leaved cottonwood, *Populus balsamifera*, L., var. *angustifolia*, Watson, and also *Populus angulata*, Smith, were frequent along the streams; *Salix nigra*, Marsh., var. *amygdaloides*, Anders., and *Negundo aceroides* were frequent along the Platte River. The most abundant shrubs were *Quercus alba*, L., var. *Gunnisoni*, Torr., the only oak of the foot-hills, except *Q. Emoryi*, Torr., which was scarce, and was a scrub-oak, seldom rising higher than 10 ft. and occurring plentifully on the dry slopes; *Cercocarpus parvi-
folius*, Nutt.; *Spiraea dumosa*, Nutt.; *Prunus Americana*, Marsh.; *Vitis riparia*, Michx., and *Acer glabrum*, Torr., the mountain maple.

The more common herbaceous plants were *Artemisia Ludovi-
ciana*, Nutt., vars. *gnaphalodes*, T. & G., and *latiloba*, Nutt., the sage bush of the plains; *Artemisia frigida*, Willd., and *A. dracunculoides*, Pursh., both plentiful; *Liatris punctata*, Hook.; *Argemone Mexicana*, L.; *Clematis ligusticifolia*, Nutt.; several species of *Eriogonurus*; *Euphorbia marginata*, Pursh.; *Achillea Millefolium*, L., a wooly form; *Solanum rostratum*, Dunal; *Lithospermum pilosum*, Nutt., and *Eritrichium glomeratum*, DC., var. *virgatum*, Porter.

The Syracuse Botanical Club —We learn that Mrs. F. J. Myers, owing to her frequent and long absences from home, and to lack of strength to perform the duties connected with the office, felt com-
pelled on the 16th of October to resign the presidency of the Syra-
cuse Botanical Club.

BULLETIN
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GENERAL INDEX.

(Illustrated articles are designated by an asterisk* before the page number.)

- Abutilon, note on, 132.
 Acollum, n. sp., 23.
 Acrostichum aureum, growing by fresh-water, 12.
 Adirondacks, flora of, 43.
 Æcidium, n. sp., 74, 75.
 Agropyrum, n. sp., *128.
 " abnormal, *78.
 Agrostis, n. sp., 21.
 Algae, fresh-water, *13.
 " marine, New England, 55.
 Alternaria, n. sp., 52.
 Amelanchier, a large, 70.
 Amorpha, fasciation in, 136.
 Anemone or Thalictrum, which? 56.
 Antirrhinum, n. sp., 126.
 Apple-tree, a large, 134.
 Arthrocladia villosa, note on, 106.
 Arthrodeamus, n. sp., 17, 18.
 Aristida, n. sp., 42.
 Artichoke, morphology in tuber of, *34.
 Artemisia, n. sp., 42.
 Arceuthobium in New Hampshire, 62.
 Aspidium lonchites, note on, 40.
 Beria, n. sp., 86.
 Berzelius catalogue, additions to, 130.
 Bigelovia, n. sp., 126.
 Boletus, n. sp., *73.
 Boraginaceae, fertilization of, 83.
 Botanical Club, Syracuse, 60, 124.
 " Torrey, 12, 36, 60, 106, 135.
 " Literature, 15, 72, 96, 134.
 " Notes, 10, 71, 88, 95, 104, 122, 133.
 Brickellia, n. sp., 86.
 Bumelia, n. sp., 90, 91.
 Cæoma, n. sp., 62.
 Calloria, n. sp., 49.
 Calocylindrus, n. sp., 16.
 California, Lower, notes from, 106.
 Centaurea, motion of stamens in, 108.
 Cenangium, n. sp., 76.
 Cercospora, n. sp., 50.
 Chellanthes, n. sp., *61.
 Chemung Co., N. Y., notes on flora of, 8, 70.
 Cleo Swamp, N. Y., flora of, 66.
 Clematis viorna, new station for, 82.
 Cocculus, polymorphous leaves in, 136.
 Comandra, haustoria of, *57.
 Compositæ, Western, new, 86.
 Conifere of Washington Territory, 47.
 Connecticut, plants new to, 102.
 CONTRIBUTORS:
 Allen, T. F., *109.
 Bailey, W. W., 75, *82, 132, 133, 134.
 Baldwin, Henry, 58.
 Britton, N. L., 67, 82, 108, 105, 129, 133.
 Buckley, S. B., 90.
 Campbell, D. H., *119.
 Collins, F. S., 55.
 Davenport, Geo. E., 4, 41, *61.
 Davis, G. P., 70.
 Dudley, W. R., *1.
 Eaton, D. C., 26, 101, 102.
 Ellis, J. B., 52, 76, 89, 96, 97, 117.
 Everhart, B. M., 76, 89, 97, 117.
 Foerste, Aug. F., 33.
 Gerard, W. R., 67, 108, 129.
 Gratacap, L. P., 79.
 Gray, Asa, 91.
 Greene, Edw. Lee, 41, 86, 125.
 Harvey, F. L., 133.
 Hervey, A. B., 57.
 Hill, E. J., 68.
 James, Jos. F., 56, 57, 82.
 Jesup, H. G., 62.
 Jones, M. E., 32, 69.
 Kunzé, R. E., 78.
 Knight, Elizabeth G., 31, *99.
 Lemmon, J. G., 133.
 Lucy, T. F., 8, 70.
 Meehan, Thos., 24, 118, 119, 132.
 Merriam, O. H., 93.
 Miller, E. S., 121.
 Millington, Lucy A., 24.
 Orcutt, C. R., 81, 106.
 Parry, C. C., 28, *50.
 Peck, C. H., 62, *73, 127.
 Perry, Geo. W., 106.
 Prentiss, A. N., 43.
 Ravenel, H. W., *54.
 Ridgway, Robert, 121.
 Rudkin, W. H., 95.
 Rust, Mary O., 66, 121.
 Schrenk, Joseph, *37, 132.
 Scribner, F. L., 7, 29, 35, *63, *77, *85.
 Stone, W. E., 9, 48, 107.
 Trumbull, Annie S., 34.
 Tuckerman, Edward, 21, 42.
 Tweedy, Frank, 47.
 Vasey, George, 21, *25, 32, 42, 52, *128.
 Wibbe, J. H., 46.
 Winter, George, 7, 50.
 Wolle, Francis, *13.
 Wright, Charles, 101.
 Corethrogyne, n. sp., 41.
 Cosmarium, n. sp., 16, 17.
 Cotyledon, n. sp., 125.
 Cucurbita Californica, *50.
 Cucurbitaria, n. sp., 53, 89.
 Cyperus refractus, note on, 32.
 Danthonia, n. sp., 52.
 Deyeuxia, n. sp., *64.
 Diaporthe, n. sp., 49, 89, 98.
 Diospyros Kaki, economic use of, 95.
 Dioecia Boykinii, new station for, 133.
 Diplachne, n. sp., 80.
 Draba, n. sp., 125.
 Eleocharis, n. sp., 101.
 Elymus, proliferous, 9.
 Epilobium palustre, bulbs of, 21.
 Eucella, n. sp., 41.
 Euastrium, n. sp., 18.
 Eustichium Norvegicum, fruit of, *99.
 Fasciation in Rubus, 48.
 " Amorpha, 136.
 Ferns, new or little known of U. S., 26, 101.
 Ferns, prothallia, development of, *119.
 " distribution of in U. S., 58.
 Fern-rust, new, 62.
 " notes, 4.
 Flora of country along Rio Grande, 122.
 " of Adirondacks, notes on, 43.
 " of Franconia Mountains, 34.
 Floras, local, of U. S., list of, 67, 103, 129.
 Flowers, sexes of, relation of heat to, 71.
 " abnormal, 71.
 Foliage, autumn, 107.

Frullania, n. sp., 132.
Fungi, n. genus of, 137.
 n. sp., 7, 49, 52, 62, *73, 76, 89, 97,
 117.
Gerardia tenuifolia, parasitic, 132.
Glonium, n. sp., 74.
Glyceria, n. sp., *77.
Gnomonia, n. sp., 96.
Gonatobotrys, n. sp., 7.
Grasses, n. sp., 21, 29, 42, 52, *129.
 notes on, 7.
 collected by Mr. Pringle, 8, 29.
 from Washington Territory, *63,
 *77.
Haplaria, n. sp., 97.
Hauatoria of Comandra, *37.
Helotium, n. sp., 98.
Hemizonia, n. sp., 41.
Hexagonia, n. sp., 73.
Impatiens, cleistogenous, 119.
Ipomoea, tricotyledonous, *82.
Juncus, proliferous, 9.
Lagophylla, n. sp., 86.
Leaves, forms of, 78.
 photepinasty of, 84.
Lecidea, n. sp., 21, 22.
Leptosphaeria, n. sp., 58.
Lichens, Western, new, 21, 49
 reproductive organs of, 84.
Limnanthemum, submerged leaves in, 84.
Lonicera grata, note on, 94.
Lophlostoma, n. sp., 52, 89.
Magnolia glauca on Long Island, 95.
Melanconia, n. sp., 117, 118.
Melanconium, n. sp., 74.
Melanthium latifolium, note on, 183.
Mentzelia as a fly-catcher, 69.
Michigan plants, notes on, 33.
Micrasterias, n. sp., 19.
Microseris, n. sp., 88.
Microsphaeria, n. sp., 75.
Mitchella repens, leafy berries in, *1.
 white-fruited, 3.
Nectria, n. sp., 77.
Nemophila, cleistogenous, 119.
Neopeckia, new genus of fungi, 137.
Nevada and Utah, notes from, 69.
New York, Central, notes from, 46.
Notholena, n. sp., 27.
Oaks, hybrid, near Washington, *25.
Enothera, n. sp., 41, 125.
Onondaga Co., N. Y., notes on flora of,
 121.
Opuntia, fertilization of, 79.
Oxytheca, n. sp., 28.
Palms and pines, among the, 81.
Peziza, n. sp., 52, 76, 98.
Pentstemon, n. sp., 127.
Photepinasty of leaves, 84.
Phyllody of sepals in Trillium, 71.
Phyllosticta, n. sp., 42, 97.
Pinus Banksiana, height of, 82, 98, 118.
 rigida in Minnesota, 132.
Plants, Western, new, 41, 86, 125.
 Texan, new, 90.
 growing in trees, 58.
Pleonectria, n. sp., 49.
Pleospora, n. sp., 53.
Poa, n. sp., 31.
Poisons, action of, upon flowers, 11.
Polygala, n. sp., 125.
Polyphyly of corolla in Trillium, 57.
Potamogeton in W. New York, 91.
Proterogyny in Spartina, 73.
Protoplasm, continuity of, 133.
Pyrenothamnium, n. gen. of lichens, 22.

PUBLICATIONS NOTICED:

Bacteria, by T. J. Burrill, 72.
Cases of Mushroom poisoning, by J. D.
 Trask, 72.
Catalogue of Davenport Herbarium, 72.
Catalogue of Flora of Oak Island,
 Mass., by H. A. Young, 135.
Catalogue of Plants of Worcester Co.,
 (Mass.), by Jos. Jackson, 131.
Contributions to American Botany, by S.
 Watson, 96.
Deutsche botanische Monatschrift, 135.
Descriptions of Iowa Uromyces, by J. C.
 Arthur, 72.
Distribution of Ferns in the U. S., by
 G. E. Davenport, 72.
Early botanical Explorers of Pacific
Coast, by C. C. Parry, 135.
Growth and Structure of a Tree, by
 W. J. Beal, 72.
Michigan Agricult. College, Report, 36.
Microscopic Distinctions between good
and bad Timber, by J. T. Rothrock, 72.
Mycologic Flora of the Miami Valley, by
 A. P. Morgan, 72.
Origine des Plantes Cultivées, par A. De-
 Candolle, 36.
Physiology of Protoplasmic Motion, by
 T. H. Engelmann, 72.
Revision of genus Clematis, by J. F.
 James, 72.
Structures which favor Cross-fertiliz-
ation in Plants, by W. Trelease, 74.
Some Algae supposed to be poisonous,
 by J. C. Arthur, 72.
Sylloge Fungorum, by P. A. Saccardo, 96.
Supplement to Chapman's Southern
Flora, 35.
Quercus, n. sp., 91.
Ramalina, n. sp., 43.
Ruestelia, n. sp., 74.
Rubus, fasciation in, 48.
Sam's Point, N. Y., flora of, 105, 121.
Senecio, n. sp., 87.
Septoria, n. sp., 97.
Snake, lignified, from Brazil, 10.
Sorosporium, n. sp., 7.
Spartina, notes on, *85.
 proterogyny in, 75.
Sphaeria, n. sp., 53, 54, 90.
Sphaerella, n. sp., 75, 98, 117.
Spicaria, n. sp., 97.
Sporobolus, n. sp., 52, 128.
Staurastrum, n. sp., 79, 20.
Stegonsporium, n. sp., 76.
Stictis, n. sp., 76.
Stipa, n. sp., 42.
Teratological Notes, 9, 122.
Thalictrum or Anemone, which? 56.
Tolypella, the American species of, *109.
Trifolium, funnel-shaped leaves in, 70.
Trillium, phyllody of sepals in, 71.
 polyphyly of corolla in, 57.
Trisetum, n. sp., *44.
Troximon, n. sp., 88.
Uromyces, n. sp., 74.
Ustilago, n. sp., 7.
Utah, notes from, 82.
Valsa, n. sp., 89, 118.
Vegetable tissue, contraction under frost, 83.
Violet with runners, 57.
Virgaria, n. sp., 97.
Walnut tricotyledonous, 122.
Weeds, distribution of, 24.
Young, Alfred R., death of, 57.
Zanthoxylum, n. sp., 90.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.]

New York, January, 1883.

[No. 1.]

Leafy Berries in *Mitchella repens*.

By WILLIAM R. DUDLEY.

(Plate xxvi.)

Several suggestive variations, more or less teratological, have come under the writer's observations during a few years past, and one is here offered to the readers of the BULLETIN which seems to follow a line of departure apparently of rare occurrence. It is the adnation, more or less complete, occurring between the berries and the true leaves of *Mitchella repens*, L.

By reference to the accompanying plate, it will be seen that a series is made out showing all conditions, from the partial adnation of one leaf-petiole (Fig. 2) to the complete envelopment of the berry by the expanded bases of both leaf-petioles (Fig. 5). There were twelve or fifteen excellent specimens in the writer's possession at the time the drawings were made (Nov., 1881), representing all grades of this union, between those shown in Figs. 2 and 5. There is, therefore, no mistake as to the true origin of these foliar organs.

The drawings need little explanation; but there are a few characters not readily made out from a black and white drawing. First, the blades of these adnate leaves were, in all cases, of the usual green color, or only a little paler. Second, in Fig. 2, the leaf on the left seems to arise from the side of the berry; but, from the *apparent* base of the petiole, the true base is plainly seen to expand, forming a broad convex covering, clasping and organically combined with the lower part of the berry itself.

The clasping base in this case, and in those in Figs. 3, 4 and 5, has always the ordinary scarlet color of the berry, and, in every way simulates its surface. Even the base of the petiole of the leaf on the right in Fig. 2 was tinged with red on account of its proximity to the red fruit. Third, it is well known that the *Mitchella* flowers are usually twin, producing two corollas, etc., but only one berry, which is inferior. The two calyx-scars are seen in Fig. 2, but the berry is so distorted, apparently by the diversion of the sap-currents into the detached leaf, that the calyx on the right is much below its usual position. Again, in Fig. 5, we find only one calyx, possessing, however, two styles, as will be seen in the vertical section of the same (Fig. 6).

We have been led to present this freak of the partridge-berry somewhat in detail, not simply because we believed there was no published record of its occurrence in this species, but chiefly for the following reasons: In the various teratological works and papers within reach, no example of a precisely similar malformation is given

of any plant. True, among the host of recent observers, it would be strange if similar cases had not been noticed, and probably records of such exist, but they cannot possibly be of common occurrence. Again, although the origin of these foliar members is evident, the meaning of the adnation is not clear; as the meaning of the reversion of the parts of a flower to leaves is clear, in the light of our accepted theory of metamorphosis.

In attempting to find the cause of the union between parts so rarely found organically united, a few facts and features were seen to stand out prominently, and led the writer to adopt the view (not a conclusive one, however,) presented later on. These facts serially stated are:

(1). The true peduncle has entirely disappeared, and those parts of the petioles coming in direct contact with the berry have become a part of it, and have readily assumed its color, texture and general aspect.

(2). This union has not interfered with the fruitfulness or development of the ovary, the seeds being present, and the size of the berry not being under the average.

(3). The flowers become consolidated, as in Fig. 5, and an increase or suppression of parts occurs in such cases without interfering with the development of the berry.

(4). In Figs. 3 and 4, where the twin corollas and calyces are distinct, there will be observed, half-way between them, a small fleshy point or protuberance, as if some extra-floral part, possibly a receptacle-like axis, had sought to show itself.

Taking these facts together, they seem to fit one hypothesis better than any other. In consideration of these points we may remark that it is stated, on good authority (see Prof. Morren's papers and Masters's Veg. Teratology), that floral monsters are usually sterile; not only on account of the suppression of stamens or carpels, but from the general disorganizing influence of such malformations. But, as we have already stated, fertility does not seem to be interfered with in our leafy partridge-berries, not even in the cases where there is a consolidation of both flowers. This condition of things has appeared to the writer to point to the conclusion that these changes are not far out of the line of the general tendency in the plant's life; and that the adnation seen may not be between as widely separated members as at first would appear. Furthermore, the first point mentioned, viz., the ready union of leaf-petioles with the berry proper, and their simulation of it, seems to indicate a closer relationship between its external portion and the leaves than we believe to exist between the leaves and the calyx. We have supposed, therefore, that a fleshy expansion of the receptacle, or an hypanthium, such as is supposed by many to exist in the lower part of the pear and some other inferior ovaries, might be present. With such a structure we could more readily imagine the union of the leaves to take place than with the calyx. At the same time, the essential organs would be less injuriously affected by this abnormal union. In brief, the changes would be between parts more or less extra-floral, and therefore not likely to seriously affect the fertility of the essential organs.

Finally, it would not be difficult to see how the twin flowers might be consolidated through the suppression of portions of this hypanthium; especially if we suppose the protuberance mentioned to be a continuation of it existing at the sides and between the two ovaries above, though not necessarily passing between and separating them internally. It is doubtful, however, whether this last point is worth much except as an attempt to explain the presence of these curious fleshy points.

In regard to Fig. 7, it was the result of a search for additional proof that the supposed petiolar expansions were really such, and superimposed over the parts commonly present. The cross-section was made above the middle of the berry, and revealed, in this one case, indistinct bands of narrow cells alternating with roundish ones, and corresponding in number to the wall of the carpel, the calyx and the epidermis of the fleshy petiolar portion. In other and similar sections no differentiations were found.

The section shown in Fig. 7, even allowing that the bands seen are to be interpreted as above, was made at such a height on the berry that it could be expected to throw little light, one way or the other, on the presence of a fleshy axis below, such as has been suggested in this paper. Subsequent sections made through the middle and lower portions of other berries revealed no differences in the hypodermal tissue that were at all clear.

All the specimens of the leafy berries from which the above studies were made were from this vicinity—the valley of Cayuga Lake. The larger number were collected in November, 1881. One (that from which Figs. 5 and 6 were taken) was found by Hon. H. B. Lord, along Cascadilla Creek, near Ithaca. The origin of the leafy appendages was not at all clear until a few days later, when by good fortune the writer found, about six miles from the first station, specimens representing all stages of the adnation. He noticed a single similar specimen on Cascadilla Creek in October, 1882.

The partridge-berry seems to be given to interesting variations. Its dimorphism has long been known. More recently, white berries have been detected at Canaan, Conn., and Moravia, N. Y.; and Dr. Atwood, the discoverer of the latter station, states that they appear on the same plants from year to year. Variations in the numerical plan of the flower, as well as the union of the two flowers, have been noticed frequently. Lastly, we note the adnation of the petioles of the upper pair of leaves with the fruit.

A word in regard to the common names. *Mitchella* seems to be pretty generally known as partridge-berry, especially by people who have studied botany. In certain portions of New England and Pennsylvania, however, it is called squaw-plum and squaw-berry, a name certainly indigenous, one might almost say aboriginal.

DESCRIPTION OF PLATE XXVI.—*Mitchella repens*, L., Fig. 1. Berry and upper pair of leaves, normal. Figs. 2, 3 and 4. Berries with leaf-petioles more or less adnate and fleshy. Fig. 5. Fleshy petioles completely enveloping the berry. Fig. 6. Vertical section of berry shown in Fig. 5. Fig. 7. Cell-structure of upper part of berry shown in Fig. 5. *a*, epidermis of expanded petiole; *b*, fleshy portion of petiole; *a'* and *b'*, fleshy calyx; *c* and *d*, carpellary portion.

Fern Notes. VI.

By GEORGE E. DAVENPORT.

Aspidium Filix-mas, Swz., in California.—In the BULLETIN for February, 1882, I announced the discovery of this species on Mt. Wrightson, in Arizona, by Mr. Pringle, and expressed the conviction that its discovery so near to California would stimulate the botanists of that State in their efforts to find it, as its presence there was more than ever probable. I now have the pleasure of announcing its discovery in the Halcomb Valley, in the San Bernardino Mts., at an altitude of about 9,000 feet, on the 1st of August, 1882, by those keen-eyed botanists, the brothers Parish.

This discovery is especially interesting from the fact that all previously reported discoveries of the species in California have apparently come from the very strong resemblance which some forms of the *A. argutum* of Kaulfuss bear to it; but, whatever doubts may exist in regard to other specimens, there seems to be no question as to the identity of the plant sent by Mr. Parish. The characters are unmistakably those of *Filix-mas* as distinguished from those of *argutum*.

These characters have previously been pointed out (*l. c.*), but it may be well to state here, in addition, that I have not found more than 5 fibro-vascular bundles in the stipes in my own specimens of *Filix-mas*, so far as I have examined them, although the number may reach 7 in others, as stated in Ferns of North America.

In my specimens from Canada (Mrs. Roy), Colorado (Brandeggee and others), Dakota (Walter Jenney), and Arizona (Mr. Pringle), the number is uniformly 5, and there are but 5 in my specimens from England. In *argutum* I have found from 3 to 5, according to the size of the fronds, and probably the correct number for *Filix-mas* will be from 5 to 7, according to the size of the fronds; but, since the same number (5) occurs in both species, and in specimens of a nearly corresponding size, it is evident that this character cannot be relied upon for positive determination.

The plant which I have received from Mr. Parish is small, heavily fruited—the fructification descending to the lowest pinnæ—and, on account of its deeply serrated margins, belongs rather to the form described as var. *incisum* than to the typical European form. I have also received from Mr. W. N. Suksdorf the upper portion of a large frond, apparently belonging to *A. Filix-mas*, which was collected by him in Washington Territory in July, 1882. The range of this species in the United States may now be given as extending from Canada (Owen Sound), or Newfoundland, according to Kunze (who stated positively that he had “seen true *Filix-mas* from Newfoundland”), to Washington Territory, in the north-west, by way of Northern Michigan and Dakota, and to Southern California, in the south-west, through Colorado and Arizona. Its presence, therefore, in intermediate stations is to be expected.

Botrychium Virginianum, Swz., var. *gracile*, Hook. & Grev. (*B. gracile*, Pursh.)—Mr. Suksdorf sends from Washington Territory a specimen of this little fern, which Pursh (Fl. Amer. Sept. Vol. ii.,

p. 656) originally described, and which some still regard as a distinct species.

In drawing up his characters, Pursh seems to have relied chiefly on the presence or absence of pubescence as the distinguishing features between his plant and *B. Virginianum*. But an examination of any considerable number of specimens will show that pubescence is sometimes present in *gracile* and wanting in *Virginianum*, so that this character was not well founded. The other characteristics are only such as might be expected in plants in different states of development.

The plant first appears as a variety of *B. Virginianum* in Hooker's Botanical Miscellany (Vol. iii., p. 223, 1833), where it was published as such by Hooker and Greville from specimens communicated by Dr. Torrey, who (*vide* same authorities, *l. c.*) regarded it merely as a variety. Later (1843), Dr. Torrey so published it in his Flora of New York, and, according to Milde (Botrychiorum Monographia), in 1847 Presl also published it as a variety in the Supplement to his Pteridographiæ. This disposition of the plant was afterwards confirmed by Dr. Milde (*l. c.*), and is now very generally accepted.

The probabilities are, however, that this form is rather the *young state* of *B. Virginianum* than a true variety. Clarence Lown writes me that with him it is not uncommon, but that it is impossible to tell where the so-called variety ends and *Virginianum* begins; and such is the testimony of the specimens which have passed through my hands. It is more than probable that if we should trace the development of *B. Virginianum* from the prothallus upward, year after year, we would find the young plant at first smooth, and with an ever increasing pubescence with age. We could thus account for the infrequency of pubescence in young plants, some retaining their smoothness longer than others.

Mr. Suksdorf's specimen is typical of Pursh's plant. It is everywhere smooth, and the bud itself is wholly free from any trace of pubescence.

In the veneration of mature specimens of *B. Virginianum* the bud is invariably clothed with a hairy covering; but, in these younger plants, the bud is but scantily clothed at the most, or is wholly smooth (as in Mr. Suksdorf's specimen)—a circumstance which does not appear to have been noticed by any one heretofore (not even by Milde, who more than once distinctly notices the hairiness of the bud in *B. Virginianum*), and which was overlooked by myself in my Notes on the Veneration in Botrychia in the TORREY BULLETIN for January, 1878 (Vol. vi., p. 193). Probably a truer diagnosis of the veneration in this species than heretofore published will be: bud smooth at first (in the youngest state), finally pubescent, the hairy covering of the mature bud having only gradually been taken on with age.

This, possibly, may also be true of the veneration in *B. ternatum*, where the bud is even more densely clothed with hairiness; but I have not as yet seen, even in my smallest specimens, a bud of that species wholly free from pubescence. Its veneration, therefore, may remain as previously described (*l. c.*).

Asplenium Bradleyi, D. C. Eaton, in *New York State*.—The only station heretofore recorded (*Ferns of North America*, Vol. i., p. 40) for this rare fern in New York State is that of the hill at Newburgh, where Prof. Eaton found it in 1864. This station, there is every reason to believe, has since been destroyed. Mr. Peck, in a letter from which I am permitted to quote, says that he searched over and around the hill for nearly a whole day without finding any of this fern. The upper part of the hill, he adds, "had recently been cleared, and I suspect the station there is destroyed." New York botanists will therefore be pleased to learn that a new station has been discovered in the Shawangunk Mts. by Clarence Lown, of Poughkeepsie, who visited the mountains on the 21st of September, 1882, for the purpose of obtaining some *A. montanum*, and unexpectedly came upon *A. Bradleyi* growing near by.

Mr. Lown, who has already partially explored these mountains with good results, writes that he now has "stronger hopes than ever of finding *Asplenium pinnatifidum* in this mountain range." The consummation of these hopes may reasonably be expected.

Mr. Lown reports *A. Bradleyi* as apparently very scarce, and this appears to be the case in all of its other known localities, a fact which should be taken into serious consideration by all botanists who may at any time be fortunate enough to find it, and for which reason its exact locality is not more definitely given here.

Abnormal Asplenium montanum.—Mr. Lown sends some very curiously forked fronds of this species, also collected in the Shawangunk Mts., where, he states, forked fronds are not uncommon. I have noticed the same disposition to fork in specimens from other localities, and this little fern really seems to take delight in such freaks.

In most of Mr. Lown's specimens, the *stipes* forks near the base into two distinct stalks, each bearing a perfect lamina. In one instance, one of these double laminæ again becomes forked just above the first pair of pinnæ, dividing into two and giving to the whole the appearance of being three-fronded. In the commonly accepted mode of designation, this three-branched frond might be considered as three fronds with their stalks united at the base, but morphologically it can only be regarded as one. In other instances the forking occurs near the top, the main rachis forking and thus forming a bifid apex. This last manner of forking is frequently met with in nearly all ferns, and is especially characteristic of *Dicksonia pilosiuscula*, in which species it is often carried to such an extent that every pinna on the frond becomes bifid at the apex.

Abnormal Osmunda regalis.—Mrs. C. N. S. Horner, of Georgetown, Mass., has given me some interesting specimens of this species in which the fertile and sterile portions are strangely mixed up, the fertile panicle proper being partly sterile (in one specimen being crowned with a sterile apex) and the upper part of the sterile portion proper being fruited in a variety of ways. Some of the upper pinnules are crenately incised, others are fertile on one side, and some, strongly auricled at the base, are sterile for $\frac{2}{3}$ or $\frac{1}{2}$ an inch, and are then abruptly contracted into a narrow, double row of cap-

sules for an inch or so, when they as abruptly expand into a broad, sterile apex. Odd freaks in this species are not uncommon. Prof. Guttenberg and others have sent me specimens of a somewhat similar character before, and many of diverse character have come under my own observation.

Abnormal Botrychium Virginianum.—Forkings of the fertile branch in this species have previously been recorded by others, as well as myself, but the only instance known to me where the fertile panicle is partly transformed into a sterile one occurs in my only California specimen—one of three specimens collected in 1873 by F. A. Miller during an excursion to the Sierras from San Francisco for seeds and plants, and, I may add, the only specimen known to me as ever coming from California. In this specimen, the branches of the fertile panicle are alternately sterile and fertile all the way up. The frond itself is of good size and there is scarcely a trace of pubescence on it; but, as the common stalk was broken off some distance from the base, it is impossible to describe its characters below.

Indexed
Feb. '83

New North American Fungi.

By GEO. WINTER.

SOROSPORIUM ELLISII.—Glomeruli forma magnitudineque varia, mox subsphæroidei, mox oblongi, opaci, e sporis numerosis compositi, 35–70 μ diam. Sporæ rotundato-polygoniæ, episporio granuloso, fuscae dissolventes, 12–16 μ longæ, 8–12 μ crassæ vel 12 μ diam.

Ad *Andropogonem Virginicam*, Newfield, New Jersey, et ad *Aristidam dichotomam*, Chester Co., Pa. Legit Wm. Trimble.

USTILAGO VILFÆ.—Massa sporarum fusconigra, inflorescentiam totam implectens et destruens (fere more *Ustilaginis destruentis*). Sporæ subrotundæ vel parum elongatæ et oblongatæ, amœne fuscae, episporio granuloso, 12–16 μ diam. vel usque 19 μ longæ.

Ad *Vilfam vaginæfloram*. Chester Co., Pa. Legit Dr. Martin.

GONATOBOTRYS MACULICOLA.—Flocci solitarii, sparsi, in macula subrotunda angulataque fusca, fusco-nigro cincta, exarida, hypophylli, longi, erecti, flexuosi, fusci, basi parum bulbosi, septati, ca. 8–12 μ crassi. Sporidia in nodulis parum prominentibus sessilia, elliptica, utrinque acutiuscula, fusca, 7–11 μ longa, 5–7 μ crassa.

Ad *Hamamelidis Virginicæ* folia languida. Bethlehem, Pa. Legit E. A. Rau.

Hottingen bei Zurich.

Notes on Grasses.—*Trichloris*, Fournier.—It was a mistake of mine to quote Fournier as the authority for *Trichloris Blanchardiana* (see No. 54 of the List of Pringle's Grasses, BULLETIN, Vol. ix., p. 146). In fact, under the circumstances, it would have been better to omit the specific name altogether. Fournier, in the Gramineæ of the Mexicanarum Plantarum Enumeratio, not yet published, has two species of *Trichloris*, *T. fasciculata*, from Mexico, and *T. pluriflora*, from Texas (= No. 1,430 Berlandier). Without descriptions or specimens for comparison, I cannot say which name belongs to Pringle's grass. Mr. Bentham, in a recent letter, states that both

the species above quoted are evidently very near the two extra-tropical South American ones, *Leptochloris*, Munro, and *Chloridiopsis*, J. Gay, but require much closer examination to establish their specific distinctions.

I am confident that I have both of Fournier's species from within our limits—one from Laredo, Texas, communicated by Mr. Isaac Burk, and the other the grass collected by Mr. Pringle.

North American Genera of Grasses. (See BULLETIN, Vol. ix., p. 134).—*Lepturus*, Br., is represented by *L. Bolanderi*, Thurber, No. 4,669 Bolander, collected in the Russian River Valley, California. *L. incurvatus*, Trin., has been gathered by Mr. Burk and others from the ballast grounds near Philadelphia. *L. paniculatus*, Nutt., is *Schedonnardus Texanus*, Steud., *Lepturus* stands between *Agropyrum* and *Hordeum*. In the Gramineæ of the Genera Plantarum, now in press, I am advised by Mr. Bentham that *Isachne* is brought into Paniceæ between *Beckmannia* and *Panicum*. *Polypogon* follows *Agrostis*, and *Alopecurus* is placed in Phalarideæ.

Arundo, Lin., which immediately precedes *Phragmites*, should be included in my list of North American genera. Prof. G. C. Nealley, of the State College of Texas, has recently sent me specimens of *A. Donax*, L., collected in his vicinity, where it has probably been introduced, as the species is regarded as native only of the Old World.

Girard College, Philadelphia.

F. LAMSON SCRIBNER.

Grasses Collected by Mr. Pringle.—Mr. C. G. Pringle sends an interesting lot of grasses which he has collected during the past season on the Pacific slope. These specimens, numbering about fifty species, fully sustain Mr. Pringle's character as a collector, for it is well known that no one makes better specimens or sends out more complete samples. Among the more desirable or interesting species in this lot, the following may be mentioned:

Phalaris amethystina, Trin.; *Hierochloa macrophylla*, Thurb.; *Stipa speciosa*, Trin. & Rupr.; *Epicampes rigens*, Benth.; *Gastridium australe*, P.B.; *Deyeuxia æquivalvis*, Benth. (*Agrostis*, Trin.); *Deyeuxia Bolanderi*, (Thurb.); *D. deschampsoides*, (Trin.), a species very distinct from Mr. Buckley's *Calamagrostis rubescens*, as will be seen by Mr. Pringle's specimens of the latter species; *Deyeuxia Aleutica*, (Trin.); *Aira caryophyllea*, L.; *Monanthochloë littoralis*, Engelman; *Lamarckia aurea*, Mönch.; *Melica stricta*, Boland.; *Agropyrum caninum*, Reichb., a remarkable mountain form, appearing like a distinct species; and *Hordeum murinum*, L.

There are several species of *Agrostis* which have not before appeared in our western collections, and which are as yet undetermined. *Poa Pringlii* and *Diplachne viscida*, two new species discovered last year (1881), were collected in quantity in their original stations the past season.

Girard College, Philadelphia.

F. LAMSON SCRIBNER.

Notes from Chemung County, N. Y.—On the 20th of July, 1882, I visited Mutton Hill Pond, Apalachin, Tioga County, N. Y., in

search of *Polemonium caruleum*, L., a station for it given me by C. D. Fretz, M.D. I failed to find it, want of time preventing as complete a search as I should have liked. The locality is peculiar, a pond, surrounded by a bog, elevated, I should think, from 300 to 500 feet above the river valley and in a depression; south and west sides wooded, the others clear, and no visible source to keep up the water supply. However, I was rewarded for my visit, as I found *Brasenia peltata*, Pursh., *Pogonia ophioglossoides*, Nutt., *Carex comosa*, Boott., *Potentilla palustris*, Scop., in flower, and two or three plants as yet undetermined. In May, I found *Jeffersonia diphylla*, Pers., and *Phlox divaricata*, L., near Dansville, Livingston County; *Cassandra calyculata*, Don., near Wayland; *Dentaria laciniata*, Muhl., and *Allium tricoccum*, Ait., at Cohocton, Steuben County. *Adlumia cirrhosa*, Raf., grows on the hills south of Addison, Steuben County. For this county, I can report the following as new finds: *Cardamine rhomboidea*, DC., very scarce; *Viola stricta*, Ait., one station on bank of Chemung River; *Vitis riparia*, Michx.; *Hibiscus Trionum*, L., escaped; *Lespedeza Stuevei*, Nutt.(?); *Ribes rubrum*, L.; *Trifolium agrarium*, L.; *Sanicula Canadensis*, L.; *Solidago Muhlenbergii*, T. & G.; *Polymnia Canadensis*, L., Chemung Narrows, rare; *Cichorium Intybus*, L., streets, N. Elmira City; *Mulgedium acuminatum*, DC.; *Pycnanthemum lanceolatum*, Pursh., Newtown Cr. Horseheads; *Fraxinus pubescens*, Lam., Chemung River; *Phlox divaricata*, L., one or two specimens, rare, and the most easterly station in the State known to me; *Scutellaria galericulata*, L., bank of Chemung River; *Quercus macrocarpa*, Michx., rare along the Chemung; *Acorus Calamus*, L., rare; *Sagittaria heterophylla*, Pursh., "Buttonwoods," Elmira, only station known to me; *Allium Canadense*, Kalm., bank of Chemung, Ashland township, with *Viola stricta*, Ait.; and *Carex pallescens*, L.

I have over six hundred duplicates, from this county mostly, and would be glad to exchange with other botanists, or sell sets if desired. Elmira, N. Y. THOS. F. LUCY.

Notes.—*Juncus acuminatus*, Michx., var. *legitimus*, Gray.—The form with proliferous heads has been very common during the past season. More specimens were found in this condition than otherwise, which I believe to be something unusual. These heads are almost invariably inhabited by large numbers of a species of aphid, which seems to find something peculiarly attractive there.

Elymus Canadensis, L.—Specimens of this also were found with proliferous heads.

Osmunda cinnamomea, L.—In the month of September I found in a meadow, from which a crop of hay had been removed early in the season, a large number of the sterile fronds of this fern, with the pinnae contracted to a greater or less degree and bearing sori, but still distinctly retaining their foliaceous character. This condition seems to be something akin to the var. *obtusilobata* of *Onoclea sensibilis*, L. Its appearance, I have no doubt, is explained by the cutting off of the frond during its period of most vigorous growth, and the consequent shock to the vitality of the plant.

Raphanus Raphanistrum, L.—A double seed-pod was found, with each of the divisions perfect and filled with seeds, but united at the base and having a common stalk.

"Twin" apples were unusually numerous during the past autumn. These offer excellent examples of syncarpy, or the adhesion of fruits.
Houghton Farm, Mountainville, N. Y. W. E. STONE.

Botanical Notes.

The Lignified Snake from Brazil.—In a brief note in the December number of the BULLETIN, Dr. Gray, referring to an illustrated account of a lignified snake published in our November number, expressed an opinion that there was no snake in the case, and stated that, at the moment of writing, he had not time to offer the two credible explanations of the phenomenon that had suggested themselves to him. In the current number of the *American Journal of Science* we find these two explanations given, and we quote them herewith:

"Through the kindness of the Brazilian Minister," says, Dr. Gray, "we have seen and examined the original specimen, and have been presented with an electrotype of it. It is a great curiosity. The resemblance to a snake is wonderfully close, although 'the scales and cephalic plates,' which M. Olivier identifies with those of a particular Brazilian snake, exist only in a lively imagination. The snake-like surface is covered by delicate meshes of woody fibres; and here and there particular fibres of woody threads can be traced from the body to the woody surface. The adopted explanation requires us to suppose that a snake had forced his way between the bark and the wood of a living tree in a position exactly under a grub or a larva; had perished there when within half an inch of its prey; was somehow preserved from decay, even to the eye-sockets and the markings of the skin, until a woody growth had formed, the elements of which replaced the whole superficial structure of the animal—until the animal was lignified!

"Two other and more probable explanations have suggested themselves. One is that the snake-like body is of the nature of a root, an aerial root, like those of a *Clusia* or a *Ficus*, which was making its way between bark and wood; and that the supposed larva is an incipient root of the same kind. The other supposes that the sinuous course is the track of a wood-eating larva or some kind of insect, the burrowing of which had not destroyed the overlying liber: consequently the new growth filling the space (except at certain points) has naturally assumed the likeness of a snake. This explanation was suggested by Professor Wadsworth, of Cambridge, examining the specimen along with the writer; and it is to be preferred. Still, that head and neck should be so well outlined, and the former so well represent a pair of orbits, were surely most wonderful. But a close inspection of the electrotype showed that there had been some cutting away at the right side of the neck, and that the narrowing there was in part factitious; and less decisive indications suggested that other outlines had been touched up. The sub-

sequent inspection of the original confirmed this; and likewise enlightened us about the eyes. For the left orbit was found to occur, not in a woody structure, like that of the right side, but in a dark material having the appearance of pitch or cement of some sort.

"We may rest assured that whatever there may be which is factitious in this most curious *lusus naturæ* originated before it came into the hands of His Excellency the Brazilian Minister at Washington. If these marks were not discerned by any of the Parisian *savants*—which we are slow to believe—they are less likely to have been noticed by Señor Lopez Netto, whose honor and good faith are incontestable."

The character of the object might, it seems to us, have been at once determined by making a transverse section to ascertain whether the serpentine form contained within it a bony frame-work, which, in the situation where the alleged lignification was detected, would naturally have proved imperishable.

Action of Poisons on the Petals of Flowers.—A. Anthony Nesbit, F.C.S., states in the *Journal of Science* that he has made some experiments on the action of various substances on the life of flowers, and for this purpose selected some of the best known alkaloids, viz., strychnine, solanine, digitaline, quinidine, atropine, quinine, cinchonine, picrotoxine, aconitine, brucine and morphine, using one-quarter per cent. and one per cent. solutions. The alkaloid of tobacco being very difficult to obtain pure, owing to its rapid oxidation, 5 per cent. and 20 per cent. solutions of tobacco (bird's eye) were used in its stead. The flower chosen for experiment was the *Narcissus*, and the results showed that there was here a wide field for long and patient investigation.

Of all the twelve solutions, tobacco proved, in a very marked manner, to be most destructive to the life of the flower of the *Narcissus*; the remaining eleven poisons, though but slowly injurious, nevertheless in some instances showed marked difference of effect, or, it may be said, symptom. Thus strychnine, next in poisonous power to tobacco, drew the petals upward, and made them dry and brittle, symptoms also exhibited by solanine poisoning, while quinidine and several other alkaloids rendered the petals limp and rotten. Morphine, one of the least poisonous (to the *Narcissus*) of the alkaloids experimented with, without destroying the flower, curiously enough imparted to the petals a flaccidity resembling that of the petals of the poppy.

The Fungi of Cincinnati.—The Catalogue of Plants collected in the vicinity of Cincinnati, Ohio, during the years 1834-44, by Thomas G. Lea (Cincinnati, 1849) contains a list of fungi, with notes on the species and descriptions of many new ones by Rev. M. J. Berkeley. The Cincinnati Society of Natural History has rendered a great service to the many students of mycology in this country by republishing, in the current number of its *Journal* (Vol. v., No. 4), all that pertains to fungi in the above-named catalogue, which has long been out of print and is now inaccessible. We are indebted for a copy of the paper in pamphlet form to Mr. Davis L. James, through whose instrumentality, we presume, the Society was induced to reproduce it.

Proceedings of the Torrey Botanical Club.—At a meeting of the Club, held at Columbia College Tuesday evening, December 12th, Prof. E. H. Day, in the absence of the presiding officers, occupied the chair.

The Librarian reported on the books and periodicals received for the library since the last meeting.

Mr. B. B. Chamberlin exhibited a specimen of *Rubus* with a fasciated stalk.

Acrostichum aureum Growing by Fresh Water.—Prof. Day exhibited specimens of *Acrostichum aureum*, L., collected by him in Cuba, and one of *Aneimia adiantifolia*, Sw., from New Providence, W.I. The specimens of *Aneimia* had four fertile segments on the frond.

With regard to the *Acrostichum*, Prof. Day remarked that Prof. Eaton, in *Ferns of North America* (Vq. ii., p. 95), writes of this species as "being perhaps the only known fern which grows only within the influence of salt water;" and he quotes Dr. Garber as corroborating this statement in regard to the localities to which it is restricted in Florida. Several authorities referred to agree with this view; though J. Smith, in the *Historia Filicum* (p. 146), says it is found "in most fern regions throughout the tropics of both hemispheres." The specimens exhibited were found growing luxuriantly by the side of a fresh-water stream, several miles inland, at an elevation of at least one hundred to one hundred and fifty feet above the sea and on the southern side of a range of hills, the side away from the ocean, where there was no suspicion of brackish water or of marine influence. It is thus an interesting question whether this fern had migrated up the stream, or whether it had survived the geological change which had elevated the range of limestone hills on which it occurs, gradually adapting itself to the change of soil and conditions.

Mr. Britton called attention to a specimen of the same species, in the Torrey Herbarium, from Pine Key, Florida, collected by the late C. F. Austin, which is labelled "fresh-water pools." This, however, does not necessarily indicate that it was out of reach of marine influence.

Mr. Britton reported that he had observed an instance in New Jersey where *Andromeda Mariana*, L., had flowered a second time during the season.

Mr. Hollick read a paper on the Flora of Richmond County, N. Y., giving a list of the additions that had been made thereto, and of the new stations that had been observed during 1880, 1881 and 1882.

The Chairman of the Herbarium Committee reported that the collection of plants left by the late M. Ruger had been incorporated with the Club's herbarium, and that the latter at present contains 1,203 species, represented by about 1,400 specimens, all of which have been properly labelled and arranged, and catalogued for reference. The Committee recommended that the field of the Club's herborizations be extended from a radius of 30 to one of 100 miles around New York City. The suggestion was agreed to.

One person was elected an active member.

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Fresh-Water Algæ. VII.

By FRANCIS WOLLE.

(Plate xxvii.) -

The following latest information concerning fresh-water algæ is submitted for the benefit of numerous friends to the cause of microscopical botany, as well as of botanical research in general.

During the past summer there have been abundant additions made to this particular division of the flora of the United States—a result largely due to the kindly assistance of volunteer collectors in the more distant parts of the country, as also of others nearer home. Indeed, but for these, the microscopist would often be at a loss for specimens worthy of his attention. I take pleasure in connection with this in acknowledging the valuable aid received from Rev. H. D. Kitchel, D.D., in working up the material that was gathered from various sources.

As the number of American students of the fresh-water algæ has greatly increased during the past few years, I have yielded to a general desire, and given the diagnosis of new species in the English language. Hitherto our students have been greatly outnumbered by European, and therefore the descriptions were given in a language familiar to all, irrespective of their nationality. With this change I adopt also the metric system of measurements.

In the appended list of new plants, all those credited to Minneapolis, Minn., were collected and forwarded by Miss Eloise Butler of that place. Miss Butler, first a student under Prof. C. E. Bessey of botanical fame, then a member of the Summer School of Science, under Prof. J. C. Arthur of the Iowa Agricultural College, Charles City, has, in her contributions sent me for microscopical investigation, furnished much more that is new than has any other collector this year.

Mr. A. D. Balen, of Plainfield, N. J., has been particularly fortunate in establishing beyond controversy the fact that the tropical alga *Pithophora*, Witt., is not confined to the tropics. Hitherto I have found it only in one small pond in this vicinity, where it was supposed to occur adventitiously. Mr. Balen finds it in three distinct localities within a circuit of about six miles around Plainfield.

Of new foreign literature upon the subject of fresh-water algæ, the following are the most important contributions:

Two volumes of the series *Algæ Exsiccatae* have been issued by Prof. V. Wittrock and Dr. Otto Nordstedt of Sweden. The two volumes are the 9th and 10th of the series. Each number contains fifty specimens, European and American, finely mounted. No words

can convey so correct an idea of a form as a view of the plant itself.

The third number of Cooke's British Fresh-Water Algæ has appeared.

N. Wille, of Norway, has published a good paper (in Norwegian) on the transitions and developing forms of the Confervaceæ.

M. Ed. Bornet, of Paris, has published a valuable article (in French) on *Mazæa*, a new genus of algæ of the order Cryptophycees.

Dr. J. Rostafinski, of Cracow, has published a monograph (in Polish) on *Hydrurus* and its connections.

Prof. G. Lagerheim has made a contribution (in Swedish) to the knowledge of several orders of algæ in the vicinity of Stockholm.

Dr. Paul Richter, of Germany, has put forth a paper (in German) on the question, "Is *Sphærozyga Jacobi*, Ag., a synonym for *Mastigocladus luminosus*, Ktz."

The latest from Prof. A. Borzi, of the University of Messina, Sicily, is the third part of his valuable contributions (Italian) on the Morphology and Biology of the Phycchromaceæ.

For a work on the American fresh-water algæ, I fear the time is not yet ripe to heed the solicitations of friends. It is true, I have added over seven hundred new names to the list of the flora of the United States, but, so long as each returning summer brings an addition of fifty or more new varieties, it would seem well to defer it.

CEDOGONIUM, Link.—*Ced. Boscii*, Witt. Collected by R. Hitchcock in a pond at Weehawken, N. J. *Ced. Tyrolicum*, Witt. In a pond, Pennsylvania. *Ced. crassiusculum*, Witt. Pennsylvania and New Jersey. *Ced. obsoletum*, Witt. Pennsylvania. *Ced. concatenatum* (Hass.) Witt. Plainfield, N. J., collected by A. D. Balen; also near Bethlehem, Pa. *Ced. Landsboroughi* (Hass.) Witt. Elmira, N. Y. *Ced. princeps* (Hass.) Witt. Minneapolis, Minn.

BULBOCHÆTE, Ag.—*B. Monili*, Witt. & Lund. Collected by A. C. Stokes, Trenton, N. J.

GONATOZYGON, D. By.—*G. asperum*, Ralfs. Ponds, Eastern Pennsylvania.

VAUCHERIA, DC.—*V. tuberosa*, A. Br. Collected by Prof. S. A. Forbes, of the State Laboratory of Natural History, Normal, Ill. The plant was dredged from Lake Michigan, four miles from Chicago, from a depth of 36 feet. This form was first described by the late A. Braun, of Berlin, from specimens found in deep waters, and also in marshy places on the continent of Europe. I have another form, collected by Capt. J. D. Smith in a marsh in Georgia in 1878. The filaments are less than half the size and devoid of the tubercle-like stolons; and it is three to five times as dichotomous as the typical form. I will call this var. *INTERMEDIA*, *n. var.* A third form, var. *DELICATISSIMA*, *n. var.*, is found on wet planks here, and, during the past summer, occurred in a small pool on the banks of the Susquehanna River, Harrisburg, Pa. The filaments are very thin and measure only 10 μ –12 μ . The branching is not so frequent, but the constrictions at the base of the branches, and interstitially, are the same. Dr. Rabenhorst questioned the propriety of classifying the typical form, the only one known to him, as a *Vaucheria*. It is very unlike all other

forms in the dichotomous branching, in the constrictions, and in the fruit.

OPHIOCYTIUM, Næg.—*O. cuspidatum* (Bailey) Rab. Pond, Mt. Everett, Mass. This plant was discovered by Prof. Bailey more than thirty years ago in a pond in Rhode Island; but it has probably not been seen since. It never received a record in an American publication, and hence this note. The proportions are very unusual for a plant of this genus, the measurements being: diameter, 50μ ; length, 150μ ; length of aculei at ends of cell, 15μ .

PROTOCOCCUS, Ag.—(A questionable genus.) *P. vestitus*, Reinsch. Ponds, New Jersey and Pennsylvania.

POLYEDRIUM, Næg.—*P. gigas*, Wittr. Ponds, Pennsylvania and New Jersey.

SPIROGYRA, Link.—*S. calospora*, Cleve. Collected by J. Reighard, Ann Arbor, Mich. *S. varians* (Hass.) Ktz. Mountain springs. *S. laxa*, Ktz. Ponds, Pennsylvania.

S. setiformis, var. *INEQUALIS*, *n. var.*—A peculiar variety of this species, consisting of two sizes of filaments, the one 125μ , the other 80μ in diameter; the two in conjugation. The smaller form has the thickness and the appearance of *S. nitida*, but must be counted a variety of *setiformis*. Sometimes two larger filaments are in conjugation, sometimes two smaller ones; but more frequently a larger and a smaller one are united. The spores in both cases are of the same size; a fruit-bearing cell of the larger filaments is not quite filled with the spore, but a spore-cell of the smaller filaments is usually considerably swollen.

S. Hantzschii, Rab., and *S. fusco-atra*, Rab., the latter probably a form of *decimina*, Mül., both from pools near Harrisburg, Penn.

ZYGOGONIUM, Ktz.—*Z. Ralfsii* (Hass.) Ktz. Ponds and marsh lands of Bucks County, Penn.

PLAGIOSPERMUM, Cleve.—*P. tenue*, Cleve, var. *CRASSIUS*, *n. var.* Shallow water, Bethlehem, Penn., and Florida.

MOUGEOTIA, D. By.—*M. glyptosperma*, D. By. Pond, Minneapolis, Minn.

GONATONEMA, Wittr.—*G. ventricosum*, Wittr. In shallow water on river shore. *G. notabile* (Hass.) Wittr. In a pond. Both species in the vicinity of Bethlehem, Pa.

These forms agree well, in size of filaments, length of articulations and dimensions of spores, with the plants described; but neither has the geniculate character of the fruiting-cells fully developed; some are perfectly straight and others only slightly crooked.

CLOSTERIUM, Nitzsch.—*C. costatum*, Corda. Ponds, New Jersey and Pennsylvania. *C. nasutum*, Nord. *C. acuminatum*, Ktz. *C. decussatum*, Ktz. The latter agrees with the description, except in size, having only about one-half the dimensions of the form described. It is true to its name.

C. angustatum, Ktz., var. *RETICULATUM*, *n. var.*—This form differs in having the striæ more or less spirally elongated, often producing a reticulated appearance.

All the above, except the first, are from ponds, Mt. Everett, Mass.

CALOCYLINDRUS, D. By.—*C. diplospora*, Lund. Pond, Mt. Everett, Mass.

C. COSTATUS, *n. sp.* (Plate xxvii., Fig. 26).—Cell ovaliform, with central constriction, nearly twice as long as wide; front view a constricted oval; end view circular. Constriction slight, forming an obtuse angle; membrane longitudinally costate; costæ distinct, 5-7, converging at apices. Diameter of cell 50μ ; length, 90μ .

In a pond, Mt. Everett, Mass.

According to some authors, this plant might be classed with *Docidium*; but, lacking the usual inflations at the base of the semi-cells, it is more properly placed as above.

DOCIDIUM, Bréb.—*D. verrucosum*, Ralfs. Frequent in ponds, Mt. Everett, Mass.

COSMARIUM, Corda.—*C. galeritum*, Nord. Marshes, Pennsylvania. *C. speciosum*, Lund., and *C. pulcherrimum*, Nord.; both rather rare, but they occur occasionally in ponds in New Jersey, Pennsylvania, Massachusetts, and no doubt in all States of the Union. *C. spectabile*, DeNtris. Pennsylvania. *C. reniforme*, (Ralfs.) Arch. In Florida, and at Minneapolis, Minn. *C. grande*, Lund. Minneapolis. *C. tithophora*, Nord., and *C. DeBaryi*, Arch.; both from ponds, Mt. Everett, Mass. *C. pyramidatum*, Bréb., var. *stenonotum*, Nord. Minneapolis, Minn.

C. TRIPLICATUM, *n. sp.* (Plate xxvii., Figs. 8 and 8a, front and end views).—Cell about one-fourth longer than wide, subrectangular; angles obtuse; sinus between the semicells linear; margins irregularly granulate, crenate; membrane rough with larger and smaller granules; the larger ones arranged in series of three; three on the margin of each of the superior rounded angles; three within the margins and three near the margin, between the angles; at the margins of the inferior angles two larger granules, and, within the margins, a few smaller scattered granules; end view quadrangular-oval, two series, usually of six longer granules, on each of the longer sides; one series on the margin and one within. Diameter of cell, 40μ ; length about 50μ . Sporangium spherical, with long spines, acute at the ends.

Ponds, Pennsylvania and New Jersey.

The nearest approach to this plant is *C. Ungerianum*, Næg. It differs in its smaller size, the details of outline, and arrangement of the longer granules.

C. SEELYANUM, *n. sp.* (Plate xxvii., Figs. 14 and 14a, front and end views).—Cell small, quadrangular, deeply constricted; sinus narrow, linear; semicells twice as wide as long, with a small rounded notch in the middle of the sides; the superior angles slightly produced laterally; ends in middle about half the breadth, somewhat produced and crenated; membrane at the superior and inferior angles, and near the margin of the ends, with 3 or 4 granules. Diameter of cell, 25μ – 30μ .

Frequent in a pond at Elmira, N. Y.

C. ELOISEANUM, *n. sp.* (Plate xxvii., Figs. 7 and 7a).—Cell rather large, one-third longer than wide; constriction forming a deep, linear, outwardly widening sinus on each side; semi-cells semicircular, margins set with long pointed teeth or aculei; centre inflated and granularly rough, intermediate area smooth or punctate; end

view oval; tumor in the centre granular; two distinct longitudinal, nearly parallel rows of teeth or aculei. Diameter, 75μ ; length, 100μ .

Pond near Minneapolis, Minn.

C. ACULEATUM, *n. sp.* (Plate XXVII., Fig. 12).—Medium size, suborbicular, length slightly less than the diameter; constriction deep, forming, by the incurving of the angles of the semicells, two elliptical sinuses; membrane primarily more or less densely aculeated; later, the aculei drop off and leave short granule-like stumps. Length of cell, 30μ ; breadth, 33μ ; breadth of constriction, 10μ .

Pond, Minneapolis, Minn.

The outline of this species bears a resemblance to that of *C. Smolandicum*, Lund., but it is aculeated and devoid of the papilla at the angles of the semicells.

C. amenum, Bréb., var. *TUMIDUM*, *n. var.* (Plate XXVII., Fig. 16).—Usually somewhat larger than the typical form; proportions the same, but the sides of the semicells tumid, not "rectis parallelis." Occasional in ponds in Pennsylvania and New Jersey.

C. EVERETTENSE, *n. sp.* (Plate XXVII., Figs. 25, 25*a* and 25*b*, end, side and front views).—Cell as long as wide; constriction deep linear; semicells broadly rounded at the ends, inferior angles obtuse and close; membrane granular, with large verrucæ arranged in concentric series; apex usually nude, surrounded by short, acute, conical teeth or aculei; end and transverse views showing a decided central inflation. Length and breadth, 50μ – 51μ .

Ponds, Mount Everett, Mass.

C. Brebissonii, Menegh., comes nearest, but differs in the form of the verrucæ, their uniform shape, and their even distribution over the cell; it is also without the central inflation.

XANTHIDIUM, Ehrb.—*X. RECTOCORNUTUM*, *n. sp.* (Plate XXVII., Figs. 6 and 6*a*).—Cell as long as wide; constriction linear, somewhat gaping; semicells semicircular, finely punctate, or smooth; two rows of beads above the central protuberance, the one with 6–10 and the other under it with half the number; another series of beads on the base, forming a ring around the isthmus; ends broadly rounded, nude; basal angles armed with two pairs of aculei, one horizontal, subulate, the other vertical, straight, neither curved nor divergent; having the form of an hour-glass when viewed transversely, truncate, crenate at the ends, with two vertical aculei in the centre. Diameter of cell, without spine, 55μ – 60μ .

Frequent in ponds, Mount Everett, Mass.

This form differs from *X. antelopæum*, Bréb., its nearest of kin, in having the end of the cells bare, the aculei not incurved or divergent, but straight and erect, attached to the sides and springing from the basal angle. It is also quite unlike that species in the three series of beads and in its transverse view.

ARTHRODESMUS, Ehrb.—*A. RAU11*, *n. sp.* (Plate XXVII., Figs. 17 and 17*a*, end and front views).—Cell slightly longer than wide, aculeated or verrucose; aculei short and stout, deciduous, leaving, after falling off, large verrucæ, usually six on the margin of each end, and two curved series of six each on the membrane within the

margin ; semicells broadly elliptical, with a single straight or diverging aculeus at each end. Diameter of cell, without aculei, 38μ ; with aculei, 63μ .

This plant was gathered with *Sphagnum* (bog-moss) by Mr. E. A. Rau in a pond near Newfield, N. J., in the month of August last. It bears some resemblance to *A. divergens*, Rab., but it is not "subtilissime verruculosus;" also to *A. quadridens*, Wood, but it is twice the size of that plant, and is not *quadridens*.

A. OVALIS, *n. sp.*—Cell small, smooth, about one-fourth longer than wide ; semicells oval, armed at each end with a straight or divergent aculeus. Diameter, without aculei, 20μ .

Ponds, Mount Everett, Mass.

A. Incus, Bréb., comes near this form in size, but is unlike it in its truncate ends.

A. ORBICULARIS, *n. sp.* (Plate xxvii., Figs. 22 and 22a, front and end views).—Cells very small, smooth, orbicular ; semicells united by a narrow isthmus ; aculei on opposite sides nearly parallel. Diameter, without aculei, 12μ .

Pond, Mount Everett, Mass.

EUASTRUM, Ehrb.—*E. MAMMILLOSUM*, *n. sp.* (Plate xxvii., Fig. 21).—Cell large, in length twice the diameter ; semicells three-lobed ; basal lobes wide and nearly half as high as the semicell, drawn out in the centre into a narrow column about one-fourth the width of the body, dilated at the end, sinuate, four-parted ; base with six mammiform protuberances ; membrane punctate ; end view oval, with three diverging mammiform prominences at each end. Diameter of centre of cell, 68μ ; of the ends, 28μ ; length, 118μ .

Pond, Mount Everett, Mass.

A distinct species ; the protuberances a prominent feature.

E. CUSPIDATUM, *n. sp.* (Plate xxvii., Fig. 18).—Small ; diameter slightly less than the length ; semicells distinctly three-lobed, basal lobes extending laterally their own width ; end lobe subrectangular, twice the width of the other lobes, obtusely sinuate in the centre ; ends of the rounded basal lobes, and of the two sections of the end lobe, surmounted each with three firm, diverging aculei. Diameter of cell, without aculei, 25μ ; length, 33μ .

Pond, Absecom, N. J. Contributed by H. D. Kitchel.

E. binale, var. *MAJUS*, *n. var.*—In all its details, except size, like the typical form, the dimensions being double the ordinary measurement. Diameter, 40μ ; length, 55μ .

In a pond near Newfield, N. J. Collected by E. A. Rau.

E. inerme, Lund., var. *DEPRESSUM*, *n. var.*—The standard form is nearly twice as long as wide, but the present form is only one-third longer than wide, and this difference produces a depressed appearance. Diameter, 36μ – 40μ ; length, 50μ – 55μ .

Newfield, N. J. Collected by E. A. Rau.

MICRASTERIAS, Ag.—*M. brachyptera*, Lund., var. *AMERICANA*, *n. var.* (Plate xxvii., Fig. 19).—Distinguished from the form found in Sweden and described by Lundell, the polar lobe not being inwardly distended, but more or less tapering. The curved points on the apices of the lateral lobules are usually in pairs, not in threes.

The arrangement of the aculei on the membrane of the cell is also distinct. The size is very nearly the same, the width being 150μ and the length 190μ .

Collected in a pond near Minneapolis, Minn.

M. conferta, Lund., var. *HAMATA*, n. var. (Plate xxvii., Fig. 1).—The polar lobe is not *conferta*, compact, close against the adjoining lobes, as in the original form, but widely separated in the middle by a deep notch or contraction below the apex, thus giving the lobe a hamate form. Diameter, 88μ – 100μ , slightly longer than wide.

Ponds, Mount Everett, Mass.

M. PSEUDOTORREYI, n. sp. (Plate xxvii., Fig. 2).—Large, circular, five-lobed; basal and intermediate lobes bisected, sections more or less conical, ends truncate and deeply furcate; polar lobe broadly cuneate, end truncate, slightly sinuate, angles cuspidate. Diameter of cell, 180μ .

Mount Everett, Mass.

Separated from *M. Torreyi*, Bailey, by its smaller size and the less number of lobules, and their greater similarity of form.

M. pseudofurcata, Wolle, var. *MINOR*, n. var. (Plate xxvii., Fig. 4).—Only half the size of the typical form, and in structure firmer. Diameter, 63μ – 75μ .

Minneapolis, Minn.

STAUSTRUM, Mey.—*St. striolatum*, Næg., and *St. pygmaeum*, Bréb., var. *obtusum*, Wille, in quiet waters, Pennsylvania. *St. spinosum*, Bréb., and *St. aculeatum*, Ehrb., both from Minneapolis, Minn.

ST. PANICULOSUM, n. sp. (Plate xxvii., Figs. 3 and 3a, front and end views).—Cell sexangular, as long as wide; semicells truncated triangles, angles rounded; inferior angles bearing two short, straight aculei; end view triangular, one aculeus visible on each rounded angle; sides moderately convex; membrane punctate, punctules in radiating lines. Diameter, 40μ – 50μ .

Marsh pool near Bethlehem, Pa.

ST. DUPLEX, n. sp. (Plate xxvii., Figs. 10 and 10a).—Of equal length and breadth, subquadrangular; constriction deep, enlarged outwardly; angles rounded, furnished with two short, stout processes, ends truncate, granulate or spinous; end view triangular, sides straight or concave, angles divided and drawn out into two short, somewhat divergent processes, ends furnished with three or four very small teeth. Diameter, 20μ – 25μ .

Pools on shore of river, Bethlehem, Pa.

The end view has a resemblance to Nordstedt's *St. gemelliparum*, but the front view is distinct.

ST. EXIGUUM, n. sp. (Plate xxvii., Figs. 23, 23a and 23b).—Very small, smooth or punctate; semicells subcuneate, sides slightly rounded, ends truncate; superior angle produced into straight, divergent arms nearly as long as the diameter of the cell; ends forked; viewed from the end, triradiate. Diameter, including arms, 20μ – 25μ .

Frequent in ponds, Mount Everett, Mass.

This minute form is nearest *St. gracile*, Ralfs, but differs in its smaller size and smoother membrane.

St. leptocladum, Nord., var. *SINUATUM*, *n. var.* (Plate xxvii., Fig. 24).—Differs from the typical form in the arms being more divergent, and in the emarginate apex.

St. ELOISEANUM, *n. sp.* (Plate xxvii., Figs. 9 and 9a, front and end view).—Small, equal in length and breadth, smooth or finely punctate; sinus produced by the constriction at an acute angle; semicells subhexagonal, basal and superior angles produced into two short processes; bifurcate at the ends; end view circular, margin with nine (usually) short processes, ends notched. Diameter, 22μ – 30μ .

Minneapolis, Minn.

This plant has some resemblance to *St. spinosum*, Bréb., but the processes are less conspicuous and the apices less distended. The end view is entirely distinct in being circular.

St. megacanthum, Lund., var. *CONVERGENS*, *n. var.* (Plate xxvii., Figs. 13 and 13a, front and end views).—Unlike those of the typical form, the aculei are convergent and sometimes cross each other, being set nearly at right angles with the long axis of the semicells. The plant is also somewhat smaller. It reminds one of *St. Dickiei*, Ralfs, but it is not so turgid, and the aculei are much longer and stouter. Diameter, without the aculei, 38μ – 45μ .

Minneapolis, Minn.

St. TRIHEDRALE, *n. sp.* (Plate xxvii., Figs. 20 and 20a, front and oblique views).—Small, punctate granulate; semicells, in front view and in end view, triangular, angles rounded, sides concave, sinus narrowly linear. Diameter, 30μ .

Pond, Mount Everett, Mass.

This species, in its front view, partakes much of the appearance of a *Cosmarium*, near *retusum*, Perty, and *angustatum*, Nord., but the side and end views are distinct. The semicells are three-sided pyramidal forms unlike those of a *Cosmarium*.

St. vestitum, Ralfs., var. *DISTORTUM*, *n. var.* (Plate xxvii., Figs. 15 and 15a).—Separated from the typical plant by its unsymmetrical form, irregularly arranged vestiture, and deeply notched margins.

Collected in the vicinity of Minneapolis, Minn.

St. Sebaldei, Reinsch, var. *SPINOSUM*, *n. var.* (Plate xxvii., Fig. 11).—The spine protruding near the margin of the sides of each semicell is a peculiarity worthy of note.

Minneapolis, Minn.

St. furcigerum, Bréb. (Plate xxvii., Figs. 5 and 5a, end and front view).—This plant is figured as a specimen of a variety. It differs from the many forms observed heretofore, in the triradiate arrangement and the long arms on the centre of the cells in the end view. The arms are usually six in number, and much shorter.

Minneapolis, Minn.

TOLYPOTHRIX, Ktz.—*T. tenuis*, Ktz. Ann Arbor, Mich., collected by J. Reighard; and Plainfield, N. J., collected by A. D. Balen.

CALOTHRIX, Ag.—*C. mirabilis* (Dillw.) Ag. Minneapolis, Minn. Thuret claims this plant for his new genus *Plectonema*. The present plant is a true *Calothrix* and answers to the diagnosis of *mirabilis*.

HYPHEOTHRIX, Ktz.—*H. luminosa*, Rab. Ponds, Pennsylvania.

ANABÆNA, Bory.—*A. circinalis*, Rab. Floating on a pond, Minneapolis, Minn. A distinct variety.

New Species of Grasses.

By GEORGE VASEY.

AGROSTIS TENUIS.—Perennial, loosely tufted. Culms 6 to 10 inches high, slender, somewhat geniculate below; leaves 1 to 2 inches long, narrow, about 2 on the culm; ligule short. Panicle pyramidal, open, 2 to 3 inches long and 1 to 1½ wide; rays in threes or fives below, above in twos or single, capillary, the longest an inch or more in length, flowering above the middle, spreading or erectish. Spikelets very small (less than a line long); glumes acute, purplish, lower one a little shorter and broader; flowering-glume thin, obtusish, 3-nerved above, a little shorter than the outer glumes, unawned; palet very minute or wanting.

Collected on the San Bernardino Mts., California, by the Parish Brothers.

AGROSTIS HUMILIS.—Perennial, tufted. Culms 4 to 6 inches high, naked above, 1 to 2 leaves below the middle; leaves mostly at the base, 1 to 2 inches long, narrow, not rigid, mostly erect; ligule short, auricled. Panicle 1 to 1½ inches long, narrow and few-flowered, branches short, mostly in threes below, above in twos or single, appressed, the larger branches subdivided and with two to five spikelets. Spikelets purple, less than a line long, outer glumes ovate-lanceolate, acute, smooth; flowering-glumes nearly as long as the outer ones, five-nerved, minutely toothed at the apex, unawned; palet hyaline, two-thirds as long as its flowering-glume.

Has the appearance of small forms of *A. varians*, but that species has no palet. Found by W. N. Suksdorf on Mt. Paddo, Washington Territory, and by Mr. Howell on Mt. Adams. Grows in compact tufts in moist places.

New Western Lichens.

By EDWARD TUCKERMAN.

LECIDEA BRANDEGEI, *sp. nov.*—Thallus rugose-plicate, straw-colored; apothecia ample (1^{mm.} .5 to 3^{mm.} in width), beneath mostly free, flat, soon becoming wavy, the disk very black and opaque, the originally pale margin soon blackening and lobulate-crenate, bright, and then demiss and disappearing, the hypothecium colorless. Spores short-ellipsoid, simple, 0.06–11^{mm.} long, and 0.004–6^{mm.} wide. Spermatia short-acicular, more or less bowed, 0.010–16^{mm.} long, and less than 0.001^{mm.} in thickness. Paraphyses distinct at length, and bluish- then brown-capitulate.

Upon rocks, Rocky Mountains, near St. Elmo, Colorado, T. S. Brandegee, in herb. Sprague. With the features, originally, of *Lecanora*, and the apothecia always showing, in section, the gonidial layer; but the natural affinity of the lichen is none the less with the

next following; to which, indeed, it is as close, as it is well-marked in its differences from it.

LECIDEA PRINGLEI, *sp. nov.*—Thallus pulvinate (reaching, in the specimens, about half an inch in height), composed of crowded, branched trunks, which are dilated above and densely plicate-rugose, and pass at the base into root-like branchlets, from pale to dark green, and finally black and shining; apothecia ample to very large (2-6 mm. in width), a little elevated, flat, soon wavy and lobed, and at length variously irregular, the disk from rufous-fuscescent very black, excluding the demiss, at first pale, but soon black and shining, stout margin, the hypothecium colorless. Spores from broad- soon oblong-ellipsoid, simple and pseudo-bilocular, 0,010-12^{mm}. long, and 0,003-5^{mm}. wide. Spermatia filiform, now bowed, 0,018-24^{mm}. long. Paraphyses conglutinate.

Rocks, Sierra Nevada, California, C. G. Pringle, in herb. Sprague. On the eastern slope of the Cascade Mountains, Washington Territory, Brandegee, in the same herbarium. The lichen last-named is strikingly differenced from that of the Sierra Nevada by the extension of the trunks upward into slender, naked stems, only at the summits expanding into the plicate state, with something of the habit and at length color of *Alectoria ochroleuca*, f. *nigricans*. The hypothecium in this species, as in *L. Brandegei*, rests on the gonimous layer, and the feature is much more pronounced and constant here than it seems to be in *Lecidea conglomerata* of Europe. But I take the latter (in which also the apothecium is originally lecanorine, though ultimately quite lecideine) to be the key to the position of both these better developed American lichens.

ACOLIUM STI. JACOBI, *sp. nov.*—Thallus of white granules soon compacted into a chinky crust; apothecia of middling size in this genus (in the solitary specimen 0^{mm}. 5-8 in width, and about the same in height), of the substance and color of the thallus, more or less turbinate, the interior exciple yellow, the disk more or less protruded, black, but yellowish-green at the surface. Spores (no thekes observed) rounded and short-ellipsoid, bi-locular, 0,020-40^{mm}. long, 0,016-30^{mm}. wide.

On the earth in "mesas," San Diego, California, C. G. Pringle, in herb. Sprague.

PYRENOTHAMNIA, *Genus nov.*

Apothecia immersed in the thallus, the perithecium fuscescent, the amphithecium colorless, the paraphyses diffuent and obsolete. Spores in saccate-clavate thekes, ellipsoid, solitary, or in twos, or in fours, 0,030-56^{mm}. long, and 0,016-24^{mm}. wide. Hymenogonia oblong, guttated, 0,010-24^{mm}. long, and 0,003-4^{mm}. wide. Thallus fruticulose, cæspitose (about half an inch high, the width of the branches 2-4^{mm}. the thickness 0,002-3^{mm}.), fragile, from a teretish base dilated above, and dichotomously much-branched, the obtuse tips crenate-dentate; the color from cinerascens fuscescent. Hyphæ forming a confused layer; the thalline gonidia 0,006-0,012^{mm}. in diameter.

P. SPRAGUEI.—On the earth, "growing in masses on the eastern

slope of the Cascade Mountains, Washington Territory, alt. 3,500-6,000 ft.;" T. S. Brandege, in herb. Sprague. Spermatophytes do not appear. The general aspect is distantly comparable with that of *Siphula torulosa*, and the nearly akin *S. coriacea* (Tayl.) Nyl. A fruticulose manner of growth is so very remarkable in the Verrucariacei that the present lichen must be separated from all sections of *Endocarpon*, whether or not the generic rank be maintained. It is appropriately inscribed to the unwearied cryptogamist, my ever liberal friend, C. J. Sprague, Esq., who has especially directed research into the lichen-flora of the Pacific coast.

A New Species of *Oxytheca*.

By C. C. PARRY.

Since the summer of 1881 the writer has had under inspection, from two successive years' collections, in abundant specimens showing all stages of development, an anomalous plant of the Eriogonæ group, found in that district of curious vegetable forms, the Mojave Desert of Southern California.

Unwilling to decide on its true relations with the other members of this extensive and peculiar Western American family without a careful examination of all the accessible allied genera, I was for some time inclined to regard it as the type of a new genus, to which, at the suggestion of Prof. Asa Gray, I applied the provisional name of *Gymnogonum spinescens*, ined. Under this name, herbarium specimens have been sparingly distributed.

Later, in correspondence with Mr. Sereno Watson on this subject, he suggested that by a very slight modification of the generic character of *Oxytheca*, the plant might appropriately come into that genus. In deference to his judgment, as well as in accordance with my own more matured convictions, I have finally adopted this view, and, suppressing the unpublished herbarium name of *Gymnogonum spinescens*, I present herewith a description of the plant as follows:

OXYTHECA LUTEOLA, n. sp.—Plant prostrate (3 to 10 inches broad), dichotomously branched from the base, smooth, or with scattered pubescence on the slender branches; leaves orbicular to oblong-ovate, $1\frac{1}{2}$ to 2 lines in width, with slender petioles three or four times as long, covered below with dense woolly pubescence, smoother above, the cauline in one-sided pairs (the third at each node obsolete or nearly so), one or both passing into linear-aciculate bracts; involucre sessile, 5-parted, the spreading unequal divisions resembling the bracts, the longer 2 to 5 lines in length (including the slender awn) and about equalling the bracts; flowers pubescent, crowded (7 to 15), developing centripetally, the short pedicel jointed at the base of the perianth and subtended by two bractlets, one linear, the other broader and scarious; perianth 6-cleft nearly to the middle, greenish-yellow; filaments short; anthers short-oval; styles short, with spreading capitate stigmas; akenes smooth; cotyledons orbicular, accumbent to the longer radicle.

Habitat.—Growing on moist, sandy soil near Lancaster Station, on the Mojave Desert, June to August; No. 259, C. C. Parry, Pacific

Coast Flora, 1881. Distinguished from other species by the more rounded long-petiolate leaves, which, as well as the bracts, are mainly in pairs instead of ternate (as occurs more or less frequently in some other species), by the closely sessile and unequally parted involucre, and by the yellowish flowers; in all other respects according with the generic character, thus increasing the accepted species of the genus to eight.

The Bulbs of *Epilobium palustre*.—Those who wish to see the bulbs of *Epilobium palustre*, L. (the *E. squamatum* of Nuttall) may find them in moist low grounds when they first appear in spring. Later, the fleshy scales of the bulbs decay and disappear. In autumn, they are found at the ends of slender stolons attached to the parent root. They are then about an inch long, of a dusky flesh-color, the scales regularly overlapping each other along the axis of growth, with the bud at the end. The roots spring from between the scales, and, as the latter decay as soon as their nutriment is absorbed by the growing plant, there are no bulbs to be seen by the time the flowers appear. The same bulbs appear on *E. molle*, Torr., and possibly on all the rest of the family.

LUCY A. MILLINGTON.

Distribution of Weeds.—Among the means whereby weeds are distributed, their being generally objectionable to cattle should not be overlooked. When in North Carolina, I noticed that wherever *Verbesina Siegesbeckia* had to struggle unaided with other native vegetation there were only plants here and there among scores of other species of vegetation. When it was growing in a pasture or along the roadside where cattle ate, it soon took possession of the whole surface, simply because cattle kept other species from seeding, while avoiding this, and thus it had the whole ground to itself. It is very often an argument that an introduced plant is better adapted to the new location than the native, because it seems to spread so rapidly; but in most cases it may be because cattle will not touch it, and there happen to be few other competitors of its class. It gets the whole field to itself. The ox-eye daisy and the buttercup spread so amazingly quite as much because cattle let them go to seed as that the climate or soil is unusually favorable. Around our large cities, *Stramonium*, wild chamomile, Canada thistle, wormseed and other well-known weeds spread only because goats, sheep, cows and geese avoid them, and they have thus nothing to interfere with their rapid spread. These remarks are suggested by an idea thrown out in a foreign periodical I have just been reading, that the great spread of some European weeds in America is a proof that they have found a soil and climate superior to those "for which they were specially created."

THOMAS MEEHAN.

New Species of Ferns.—In our next number, Prof. D. C. Eaton will describe some new United States ferns, give new stations for a number of old species, and notice Prof. Lemmon's very interesting discoveries made last August in Arizona.

BULLETIN
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New York, March, 1883.

[No. 3.]

On Three Hybrid Oaks near Washington, D. C.

By GEORGE VASEY.

(Plates xxviii.—xxx.)

Hybrid No. 1, or "Saul's Hybrid." (Plate xxviii.)—This tree is growing on the premises of Mr. John Saul, a nurseryman and florist, about two miles north of the city. It is growing in a thicket mostly composed of white and red oaks and chestnuts. The tree towers up to the height of some fifty feet. The general appearance of the trunk and branches suggested to me a young *Quercus rubra*, but a glance at the leaves and fruit referred it at once to the white oak group. But the bark does not have the usual whitish color and scaly character of the white oak. The bark of *Quercus stellata* (post-oak) is closer and less scaly than that of the white. The bark of the true *Quercus Prinus* is still closer, harder and darker colored, and on the branches is quite smooth. The bark of this hybrid appears to combine the qualities of *Quercus alba* and *Q. Prinus*. The leaves are mostly five or six inches long, with an average breadth of about two inches, mostly acute and narrowed at the base, and with a pretty uniform width of outline. There are six or seven lobes on each side, pointing with a strong and uniform angle toward the apex. The sinuses are mainly about an inch deep, reaching within half or three-fourths of an inch of the midrib. The lobes are remarkably uniform in size, breadth and direction. The upper surface is of a dark, glossy green, the under surface of a bluish-white or glaucous color, and smooth. The petiole is an inch to one and a half inches long, flexible, and of a yellowish color, as in *Q. rubra*. In texture, it is a little thicker than in *Q. alba*. The acorns are like those of *Q. Prinus*, averaging nearly as large, and with the same tuberculated cup. There is seldom more than one matured on a twig, and they have a pretty stout pedicel of half an inch in length. Growing under the tree there are two young trees or bushes about eight feet high, which apparently are seedlings from it. In this, as in most other oaks, the leaves on the lower branches and the leaves of the sprouts differ considerably from those of the upper and fertile branches, being broader and more irregular in lobation. It is difficult to fix the parentage of this tree, but the acorns point unmistakably to *Quercus Prinus*, and the leaves we may suppose to combine the characters of *Q. Prinus* and *Q. alba*. Dr. Engelmann thinks it may be a new variety of *Q. Prinus*.

Hybrid No. 2. (Plate xxix.)—This tree is growing about six miles north of Washington, near Silver Spring Station, and close by the roadside. In fact, there is a clump of three trees, evidently

sprouts from an original tree, which was cut down probably twenty-five years ago. The three trunks are of about equal size—about twenty feet high—and branch within six feet of the ground. The bark is closer and darker colored than that of the white oak. The leaves in outline, but not in lobation, are much like those of the Saul's hybrid, being six or seven inches long, and narrow, with about four pairs of lobes; most of the sinuses reaching within half an inch or less of the midrib. The base of the leaf is generally obtuse and rounded, gradually widening for an inch or more to the first pair of lobes, which are scarcely more than coarse teeth. The remaining lobes are rather irregular, there being usually two or three pairs of large ones of about an inch in length each, then a pair of small short ones or teeth, ending in a narrow acutish point of about half an inch. The middle pair of lobes is the longest and broadest, making the greatest breadth of the leaf, which is about two inches. The under surface of the leaf is of a light gray, with a minute and sparse pubescence. The lobes generally point strongly forward, but frequently one or two diverge nearly at right angles. The upper surface is smooth, dark green; and the texture is considerably thicker and firmer than in *Q. alba*. The petiole is about an inch long, narrow, but less flexible than in No. 1, and destitute of the yellowish color. The acorns mature mostly in twos, and the common peduncle is about half an inch long, and thick. The acorns are about the size and form of those of *Q. alba*, the cup covering about one-third, with a thin edge, and with close smoothish scales. This tree seems to show a mixture of *Q. alba* and *Q. stellata*, with a preponderance of *Q. alba*.

Hybrid No. 3. (Plate xxx.)—This tree grows close by the roadside about two miles north of the city, near what is called Piney Branch. It is, perhaps, twenty-five feet in height, and the trunk a foot in diameter. The bark and general habit of the tree is much like that of *Q. stellata*, the bark being close and dark in color. The leaves, in length, are five or six inches, slightly shorter than in hybrids numbers one and two, and broader. There are about five pairs of lobes, of which the third and fourth are the largest and broadest. They are coarser and wider, and have greater divergence than in the others, and the central part of the leaf is broader. The lower surface is grayish, rougher and more pubescent than in number two. The upper surface is of a dark shining green. The leaf is firmer in texture than in either of the others; the petiole is stiffer; and in outline, rigidity and roughness it shows an evident approach toward *Q. stellata*. The same relationship is manifested in the acorns, which are broader and more depressed than those of *Q. alba*, evidently approaching those of *Q. stellata*, but much larger. In other respects it is *Q. alba*.

New or Little-Known Ferns of the United States. No. 13.

By D. C. EATON.

43. *Polypodium thysanolepis*, Al. Braun.—Rootstock creeping, densely scaly; stalks two to six inches long; fronds as long as the stalks, ovate in outline, sub-coriaceous, slightly scaly above, clothed

beneath with ovate reticulated ciliate scales, pinnatifid into rather few oblong or oblong-spatulate entire segments separated by broad rounded sinuses; veinlets anastomosing in a single series of large areoles, each areole enclosing a sorus, outer veinlets free.—Baker, Syn. Fil., ed. 2, p. 512.

Collected on the Huachuca Mts., Arizona, by Prof. and Mrs. Lemmon in August, 1882.

This is a well-known Mexican fern of the same group with *P. incanum*, from which it differs by its usually larger size, its fewer, broader and more distant segments, and especially by the heavier covering of larger, laxer and beautifully ciliated scales. It is No. 971 of Parry and Palmer's collection of 1878, from San Luis Potosi, and No. 210 of Ghiesbreght's Chiapas distribution.

44. *NOTHOLÆNA CALIFORNICA*, n. sp.—Rootstock short; stalks clustered, two to four inches long, black, wiry, when young scaly with lanceolate dark-brown rigid scales; frond ope to two inches long, broadly deltoid-ovate or pentagonal-ovate, from a quadri-pinnatifid base gradually simpler to the apex; ultimate segments oblong or triangular-oblong, small (1-2 lines long) and very numerous and crowded; upper surface minutely glandular; lower surface copiously farinose with yellow or whitish powder, except on the strong blackened rachis and midribs; margins more or less recurved, but not covering the copious dark-brown sporangia.

San Diego Co., California, Miss Burbeck, Mr. Cleveland and Mr. Stout. Colorado desert, Dr. Parry. Arizona, Prof. Lemmon.

This plant I have for a long time confused with *N. candida*, Hook., as at pp. 22 and 23 of the second volume of Ferns of North America, where it is spoken of as the Californian form of that species. It has smaller and more compound fronds than *C. candida*, and occupies in the genus a position about midway between that species and *N. Chilensis*. The powder is so abundant that it is sometimes difficult to glue a specimen to paper.

45. *Notholæna Aschenborniana*, Klotzsch.—Rootstock short, creeping; stalks clustered, dark-chestnut, copiously beset at the base with rigid blackish ciliated lanceolate-acuminate scales, which become more delicate higher up the stalk, and pass into a dense whitish or pale-ferruginous tomentose mass which covers the frond; fronds 4-10 inches long, pinnate, the pinnæ an inch long or less, rarely more, pinnatifid into very numerous sessile, oblong, entire or crenately lobed obtuse segments, upper surface at length becoming smoothish, the lower indistinctly farinose beneath the heavy coating of ciliate cleft scales; sporangia forming a dark line around the edges of the segments.—Klotzsch, in *Linnaea*, xx., p. 417.

This was first gathered near Chepultepec, in Mexico, by Alwin Aschenborn. Fournier (Pl. Mex., Crypt., p. 124) gives among the localities "Texas, Trécul, No. 1,456, Drummond, No. 354." Dr. Edward Palmer found it in the mountains east of Saltillo, Nuevo Leon, Mexico, in 1880; and now it is found and identified by Mr. Davenport among some unnamed ferns sent by Prof. Lemmon from the Huachuca Mts. It has a decidedly less compound frond than *N. Newberryi*, and may be easily recognized by the beautifully

ciliated scales, soft and tomentose on the pinnules, but gradually more and more rigid towards the rootstock, where they are hard and nearly black.

46. *Pellaea marginata*, Baker.—Stalks tufted, slender, castaneous, shining; fronds four to six inches long and nearly as broad, deltoid in outline, tri-quadri-pinnatifid, segments linear-oblong, chartaceous; smooth; involucre broad, continuous, delicate, the margin slightly crose.—Syn. Fil., p. 151. *Cheilanthes marginata*, Hooker.

Huachuca Mts., Arizona, Prof. and Mrs. Lemmon, August, 1882. Common in Tropical America from Mexico and the West Indies to Peru. It is often difficult to distinguish between this and *P. angustifolia*, though the latter has commonly a less decomposed frond, and longer and more distant ultimate segments.

47. *Cheilanthes Alabamensis*, Kunze.—Huachuca Mts., Arizona. Prof. and Mrs. Lemmon, August, 1882. A more western station than any before reported.

48. *Cheilanthes lindigera*, Swartz.—Rootstock cord-like, creeping, covered with soft narrow scales; stalks rather distant, 4–8 inches long, at first loosely tomentose with ferruginous hairs, at length castaneous and nearly smooth; fronds as long as the stalks, ovate-oblong, thrice to four times pinnate, ultimate pinnules cuneate-obovate, less than a line long, the margin recurved and the white involucre leaving but a small opening in the middle, making the pinnules pouch-like; upper surface green and naked, the lower hairy.—Hooker, Sp. Fil., ii., p. 95, t. civ., B.

Huachuca Mts., Prof. and Mrs. Lemmon.

This is another well-known species of Mexico and the Andes of Colombia and Ecuador. It is much less woolly than *C. tomentosa*, and the pouch-like ultimate pinnules are very noticeable.

49. *Asplenium montanum*, Willd.—This must now be considered a New England fern. One day last April three students of the Academy at Norwich, Conn., started out for a day's search for "trailing-arbutus, lichens and rocks." Messrs. Fuller and Setchel found this fern in clefts of rocks on Lantern Hill, which rises between the towns of Ledyard and North Stonington. Mr. Fuller first saw the plant, Mr. Setchel identified it, and Mr. Collin has the honor of being one of the party.

About Christmas, 1882, Mr. C. B. Graves, of New London, also discovered the plant on the same mountain, and also on a smaller hill distant a little way to the north-east. Mr. Graves says it is not uncommon in holes and crevices of the rock. It is to be hoped that the difficulty of getting to the place will long prevent the extirpation of the fern.

50. *Asplenium monanthemum*, L., was found among Prof. Lemmon's Huachuca ferns by Mr. Davenport, who has sent me three fronds. They are all rather smaller than common Mexican specimens. One of them has uniformly monosorous pinnæ, one shows here and here a second sorus, and the third has regularly three or four sori on most of the pinnæ. Usually this fern has decidedly larger and more erect fronds than *A. Trichomanes*, and the few large sori are along the lower edge of the pinnule.

51. *Asplenium Glenniei*, Baker, described at p. 488 of the second edition of *Synopsis Filicum*, was scantily collected on the Huachuca Mts. by Prof. Lemmon. It is a small fern growing in little tufts like *A. montanum*; but the fronds are lanceolate, tapering both ways, 2-6 inches long, pinnate, with many pairs of oblong, toothed or pinnately lobed deep-green pinnæ. The sori are abundant, rather large, slightly curved outwards, and placed mostly very near the midrib of the pinnules. The fern comes near the old world *A. fontanum*, but is not closely allied to any of our common species. I am obliged to Mr. Baker for the identification.

52. *Aspidium juglandifolium*, Kunze.—The free-veined form which has been called *Phanerophlebia nobilis*, is in Prof. Lemmon's Huachuca collection. This was found in Western Texas many years ago, but has never been distributed to herbaria from any station within the borders of the United States. With this, Prof. Lemmon secured a few fronds of *Aspidium Filix-mas* and a few of an *Aspidium* with decompound fronds, the species not yet clearly recognized.

A List of Grasses collected by Mr. C. G. Pringle in Arizona and California, with descriptions of those species not already described in American publications.*

62. *Cottea† pappophoroides*, Kunth, Gram., i., 84.281. t. 52; Enum. Pl. i. 256; Steud, Syn. Pl., i. 201.

Perennial. Culms erect, branched at the base, 2 feet high, smooth below, pubescent above, especially at the joints and on the main axis and branches of the panicle. Leaves flat, 2-3 lines wide, 5-8 in. long, involute towards the tip; sheaths loose, pubescent like the leaves; ligule a ciliate ring of short hairs. Panicle lanceolate in outline, 6-8 in. long, the more or less spreading branches solitary, the lower ones about 2 in. long, branched a little below the middle, the branchlets 1-3-flowered. Spikelets about 4 lines long, exceeding their pedicels; outer glumes lanceolate, $2\frac{1}{2}$ lines long. Flowering-glume 2 lines long, striate with 9 prominent nerves and several intermediate less prominent ones, the two lateral divisions more deeply cut than the others and somewhat divergent; the three longest awns a little over a line in length. The edge of the flowering-glume, for a short distance above the base, is densely pilose with hairs a line long.

Near Tucson, Arizona, Dec. 7th.

This is the same as No. 2,057 of Wright's N. Mex. collection, 1851-2. Mr. Pringle found only a single specimen, which is an old one, but sufficiently perfect to show the above-enumerated charac-

* Continued from page 145, Vol. ix.

† COTTEA, Kunth.—Panicle open; spikelets 6-9-flowered, the upper imperfect. Outer glumes 2, membranaceous, concave, many-nerved, the lower one 3-lobed at the tip, lobes acute-mucronate, the upper one a little smaller, entire, acute. Flowering-glume 5-cleft, the lateral lobes deeper than the others, concave, sub-11-awned, awns continuous, straight, unequal, three longer than the others. Palea bicarinate, apex bifid, lobes acute-mucronate. Stamens three. Ovary smooth. Styles 2, terminal. Stigmas plumose. Grain oblong, nearly terete, smooth and freely enclosed within the palea.

ters. The genus has but the one species, which extends southward into Peru.

63. **Triodia mutica*. *Tricuspis mutica*, Torr., Bot. Whipple, p. 156; Porter and Coulter, Syn. Flor. Colorado, p. 148. = No. 2,046, C. Wright, N. Mex., 1851-2.

No locality given for Mr. Pringle's specimens.

64. *Triodia pulchella*, HBK., Nov. Gen. i., 155, t. 47; *Tricuspis pulchella*, Torr., Pac. R. R. Surv., iv., 156; Thurber, Bot. Cal., ii., p. 301.

65. *DIPLACHNE VISCIDA*, *n. sp.*—Similar in habit and inflorescence to *D. fascicularis*, P.B., but smaller throughout and "covered with acrid viscid glands." Panicles from one to three inches long, sessile in the axils of the leaves, and mostly enclosed by the inflated sheaths, densely flowered, the erect or ascending branches rarely exceeding an inch in length. Spikelets about 2 lines long, nearly sessile, 4-6-flowered. Outer glumes lanceolate, acute, the lower a line long, the upper a little longer and larger. The first flowering-glume about $1\frac{1}{2}$ lin. long, shortly ciliate below on the central and lateral nerves, scabrous above, two-lobed at the tip, lobes rounded-obtuse, the central nerve produced between them into a scabrous awn one-half a line long. Spikelets often reddish or purplish, as well as the culm and leaves.

Santa Cruz Valley, near Tucson, Arizona. June 28th, 1881.

This grass may have been introduced from Mexico or from regions farther south, since, as Mr. Pringle states, it grows in valleys which are inhabited. Mr. Pringle is inclined to the opinion, however, that it is indigenous to the region where he gathered it. It is not improbable that it has already been described in works not accessible, treating of more Southern plants.

66. *Diplachne dubia*. *Leptochloa dubia*, Nees in Mart. Brazil, ii., p. 433; Chapman in Flor. So. States, p. 559.

Fuller's Ranch, Arizona. July.

67. **Diplachne imbricata*. *Leptochloa imbricata*, Thurber, Gram., Mexican Bound. ined.; Bot. Calif., ii., p. 293.

Santa Cruz Valley, near Tucson. July.

This is the same as No. 404 of F. Palmer's Coll., 1875.

68. *Eatonia obtusata*, Gray, in Manual, 5th ed., p. 626.

Near Tucson, Arizona.

69. **Eragrostis Purshii*, Bernh., var. *delicatula*, Munro. *E. diffusa*, Buckley, in Proc. Phil. Acad., 1862, p. 97.

Santa Cruz Valley, near Tucson.

This grass was distributed as var. *diffusa* of *E. Purshii*.

70. *Eragrostis pilifera*, Scheele. Steudel, Syn. Glum., p. 278.

Santa Catalina Mts., Arizona. April.

This grass has been proposed as a variety of *E. pectinacea*, Gray, some forms of which it resembles in habit and inflorescence, but the spikelets are narrow and less flattened, and the lateral nerves of the more obtuse flowering-glume are obsolete.

71. *Melica aristata*, Thurber, in Bolander's revision of the Meliceæ, in Proc. Calif. Acad. Sci., iv., part 2, p. 102; Bot. Calif., ii., p. 305.

Mt. Shasta, Cal., alt. 6,000 feet. August.

72. *Melica fugax*, Boland., Proc. Calif. Acad., iv., p. 104; Thurber Bot. Calif., ii., p. 304.

Mt. Shasta, Calif., alt. 6,000 feet. August.

A tall form with a racemose few-flowered panicle.

73. *Distichis maritima*, Raf. Thurber, Bot. Calif., ii., p. 306; *Brisopyrum spicatum*, Hook.; Gray, Manual, p. 628.

Santa Cruz Valley, near Tucson.

74. *Poa Californica*. *Atropis Californica*, Thurber, Bot. Calif., ii., p. 309.

Santa Rita Mts., Arizona, alt. 4,500–6,000 feet. April.

Both the male and female plants are represented.

75, 76. *Poa*—probably forms of *P. tenuifolia*, Nutt. The first, from the mountains about the head-waters of the Sacramento River, has a stout culm with flat radical and cauline leaves, 2–4 in. long, the outer glumes obtuse, the upper one over 2 lines long, equalling the first floret; the second, from Mt. Shasta, more nearly approaches the typical form of the species.

77. **Poa annua*, L., var. *stricta*, Vasey. Panicle narrow, 3–5 in. long with erect branches. Truly indigenous.

Banks of the Rillita.

78. *POA PRINGLI*, n. sp.—Culms about 6 in. high, slender and scape-like, with a single leaf below the middle, densely tufted from a creeping root-stock, the base surrounded by the loose sheaths of the radical tuft of short (1–2 inches) convolutedly folded, smooth and narrow leaves. The cauline leaf about $\frac{1}{2}$ an inch long, narrow and folded like those at the base, minutely scabrous at the somewhat pungent tip. Panicle about an inch in length, narrow and few-flowered; lower branches in pairs, bearing one or two spikelets which they about equal in length. Spikelets 3–4 lin. long, 3–5-flowered. Outer glumes broadly lanceolate, three-nerved below, with broad scarious margins, the upper one about as long as the spikelet, the lower a little shorter and smaller. Flowering glume about $3\frac{1}{2}$ lines long, broadly lanceolate, with a broad scarious margin above, 5-nerved, minutely punctulate-scabrous all over and strongly scabrous on the midnerve above, smooth below. Pale one-fourth shorter than its glume. Scales broad and irregularly cut or toothed.

Mountains about the head-waters of the Sacramento River, California. September.

There is considerable variation in the size of the spikelets, which, in most specimens, are purplish in color and have a membranous appearance. It is apparently diœcious. The staminate plant is more slender, with more acute glumes.

The species is allied to *Atropis Californica*, Munro, but appears to be sufficiently well marked to be kept distinct.

79. *Festuca tenella*, Willd., Sp., i., 419; Gray, Manual, p. 633.

By streams of the Santa Catalina Mts.

80. **Festuca microstachys*, Nuttall, Plant. Gambel, 187; Thurber, Bot. Calif., ii., p. 317.

By streams of the Santa Catalina Mts.

81. *Bromus Hookerianus*, Thurber, Bot. Wilkes's Exped., 493; *B. virens*, Buckley, in Proc. Phil. Acad., 1862, 98; *Ceratochloa grandi-*

flora, Hook. Flor. Bor. Am., ii., 253, t. 235; Thurber in Bot. Cal., ii., p. 321.

Mountains about the head-waters of the Sacramento River, alt. 7,500 feet. August.

This seems to be the same as No. 648 of E. Hall's Oregon collection, ticketed "*Bromus (Ceratochloa) carinatus*, Hook., var."

82. *Agropyrum caninum*, Reichenb., Icon. Fl. Germ., t. 119; *Triticum caninum*, L.; Gray, Manual, p. 638.

Santa Rita Mts., Arizona. July.

This is the form "differing from the type in its large and spreading, usually much crowded spikelets, and its long, stout and divergent awn," referred to by Dr. Thurber in his remarks under *Triticum caninum*, in Bot. Cal., p. 324. It is certainly very distinct from the ordinary forms of the species, and should at least have a varietal name—say var. MAJUS.

83. *Hordeum nodosum*, L. Thurber Bot. Cal., ii., p. 325; *H. pratense*, Huds.; Gray, Manual, p. 638.

Santa Cruz Valley, near Tucson.

84. *Elymus Canadensis*, L. Gray, Manual, p. 639.

By streams of the Santa Rita Mts.

85. **Elymus Sitanion*, Schult. Thurber, Bot. Cal., ii., 327; Watson Bot. King's Exped., 391; *Sitanion elymoides*, Raf.; *Egilops Hystris*, Nutt., Gen., i., 86.

Santa Rita Mts., Arizona. May.

Girard College, Philadelphia.

F. LAMSON SCRIBNER.

Note on *Cyperus refractus*, Eng.—For several years past I have frequently collected in this locality a *Cyperus* which I could not make correspond with any species in Gray or Chapman. On a recent visit to Cambridge I took occasion to look up the subject, and found, in Dr. Gray's herbarium, specimens of the same species with the manuscript name of *Cyperus refractus*, Eng. On calling Mr. Watson's attention to it, he recalled the fact of its publication under that name in *Linnaea*, Vol. xxvi., p. 369, in the description of the Cyperaceæ of the Berlin Herbarium, the type specimen having undoubtedly been furnished by Dr. Engelmann. It is probably the same plant as is described in Steudel as *Cyperus retrofractus*, Eng., but is not the *C. retrofractus* of Torrey. It is a tall, strong plant, 2 to 3 feet high, with from 5 to 10 unequal rays, the longest frequently 10 inches, naked except 1 or 1½ inches at the extremity. The spikelets are 8 to 10 lines long, about 6-flowered, spreading horizontally and becoming retrofracted. The nutlets are triangular, linear-oblong, about 1½ lines long. It is undoubtedly pretty widely diffused in the country.

Washington, D. C.

GEO. VASEY.

Notes from Utah.—In "Fern Notes, VI.," Mr. Davenport speaks of *Aspidium Filix-mas*. This plant was discovered by me in August, 1882, in quantity in the Wasatch Mts., Utah, and it undoubtedly ranges through all the higher mountains of Colorado, Utah, Nevada, etc.

In the same locality, I found in great abundance the rare Utah ferns *Aspidium Lonchitis*, *Polypodium vulgare* (typical form and var. *occidentale*) and *Adiantum pedatum*. The last has remained till this year unseen since its discovery by Mr. Watson ten years ago. The specimens are the same robust ones that are so familiar in the dells of Iowa.

Cleome sparsifolia, Wats.—I have this in excellent specimens. Mr. Watson's specimens were evidently too old, as the figure in Bot. King does not represent the species accurately. The bracts (so conspicuous in the figure) are inconspicuous; they are seldom elliptical, and are always acute. The leaves (which should appear all over the figure, except at the very base) have petioles 6" to 9" long, and three oblanceolate, acute leaflets. The petioles gradually lengthen toward the base of the stem, where they are 1' to 2' long. The leaflets toward the base become shorter and less acute, till at the root they are spatulate-linear, very obtuse and mucronate. The siliques are often 18" long. The plant is 2° or more high.

Salt Lake City, Utah.

MARCUS E. JONES.

Notes on Michigan Plants.—At Adair, about eight miles west of St. Clair, I spent several weeks last summer, and made a series of notes relative to the flora of that region.

It is said to have been once covered with forests of the white pine (*Pinus Strobus*), but these were thinned out by the lumberers, and finally destroyed by a great fire which ravaged this section of country. I found, however, a few trees, 20–30 feet high, which may have grown from seeds dropped after the fire.

Instead of the old forests, dense growths of *Populus tremuloides*, *grandidentata* and *monilifera* have sprung up in many places and become characteristic of the burnt regions. An occasional *Betula lenta* and *lutea* is sometimes found. The result has been an irregular growth of timber, allowing the passage of the sun's rays and a consequent growth of many sun-loving plants, offering a striking contrast to the ancient sombre forests which usually meet our eyes at this time of the year. In marshy places are found *Ranunculus alismæfolius*, *Ludwigia polycarpa*, *Samolus Valerandi*, var. *Americanus*, *Myosotis laxa* and *Aspidium Noveboracense*. In clearings, *Gnaphalium purpureum* is not uncommon. *Epilobium spicatum* and *Erechtites hieracifolia* are the first to occupy burnt grounds. *Hypericum Canadense*, var. *majus*, *Rubus hispidus*, *Lonicera parviflora*, var. *Douglasii*, *Pyrola elliptica*, the crimson form of *Monotropa Hypopitys*, *Collinsonia Canadensis*, *Hedeoma pulegioides*, *Euphorbia hypericifolia*, *Spiranthes Romanzoviana*, *Oakesia sessilifolia* and *Osmunda regalis* belong to the flora. *Daucus Carota* has become naturalized in the country west of Adair. Only two trees of *Liriodendron Tulipifera* were observed. I also found an *Elodes* which, I think, explains the *petiolata* (?) in Wheeler and Smith's catalogue. It was sent at the time to Prof. Thos. C. Porter, and I think that the facts cannot be better stated than by copying the words he used: "It is the same thing which I collected years ago in Central Pennsylvania, and Garber on Lake Conneaut, Crawford Co., in 1868.

The broader and paler leaves give it an aspect different from *E. petiolata* of Maryland and further south; but then the *lower leaves taper into a distinct petiole*, and the upper, though broader at base and almost sessile, are *not clasping*. The calyx is only one-third the length of the mature capsule, and the sepals are more obtuse. I have no flowers to examine the union of the filaments. And yet, with all the characters of *E. petiolata*, I agree with you in suspecting it to be a variation of *E. Virginica*."

Diligent search by our Michigan friends for the flowering plant would soon settle the doubt.

Dayton, Ohio.

AUG. F. FOERSTE.

Submersed Leaves in *Limnanthemum*.—The fact that thin root-leaves occur on *Nuphar pumilum*, Smith, and occasionally on *N. advena*, Ait., has long been known and is on record; but, that the floating heart (*Limnanthemum lacunosum*, Griseb.) may bear similar leaves, has, I believe, been hitherto unnoticed. However, in two specimens of this plant collected at Wellington, Nova Scotia, in 1879, there are found four such leaves, 3 by 2½ in., of a delicate texture, diaphanous, and of a light green color with a tinge of red. They show a well-marked venation, have a broader sinus than the floating leaves, and are borne on short petioles.

ELIZABETH G. KNIGHT.

The Flora of the Franconia Mountains.—I have just read in the September BULLETIN Prof. Bailey's notes concerning the flora of the Franconia Mountains.

After preparing the list to which he refers—published by Mr. Prime in the *Journal of Commerce*—I left the north country and did not return until late in the summer. But I then made some interesting additions to my catalogue.

On the borders of Lonesome Lake grows in great profusion the *Utricularia cornuta*. On the edge of Echo Lake, near the boat-house, I found the *Subularia aquatica*, mentioned in Gray as found there by Tuckerman. In addition to the orchids named in my list, and those mentioned by Prof. Bailey, I gathered *Habenaria psycodes*, *H. fimbriata*, *H. tridentata*, *Goodyera repens* and *Spiranthes cernua*. On the top of Bald Mountain, the bear-berry (*Arctostaphylos Uva-ursi*) grows plentifully; and I also found there the alpine variety of *Solidago Virga-aurea*. On the Bethlehem road, quite near Franconia village, I gathered the finest specimens of *Solidago squarrosa* I have ever seen, the stems fully five feet in height, and the spike of flowers more than a foot long. The prevalent *Aster* is the *acuminatus*, and I found its "depauperate, narrow-leaved variety on Bald Mountain, and the *macrophyllus* near the base.

Between the Profile House and Echo Lake I saw two *Nabali*, the *albus* and *altissimus*. *Lobelia Dortmanna* grows on the borders of Profile Lake.

Hartford, Conn.

ANNIE TRUMBULL SLOSSON.

Bentham and Hooker's Genera Plantarum.—Part 2 of Vol. iii., completing the work, is nearly ready for publication. Those who wish to obtain this part, like the preceding, at trade price, through us, will please to send a notification to that effect to "The Curator of the Harvard University Herbarium, Cambridge, Mass., without delay.

ASA GRAY.

(The trade price in London for the new part is £1, 4, 0.—ED.)

Botanical Literature.

Supplement to Dr. Chapman's Southern Flora. University Press. Cambridge: John Wilson & Son. 1883.

Since the publication of Dr. Chapman's *Southern Flora*, in 1860, a large number of species has been discovered by various collectors within the region it embraces, and botanists have long felt the need of a work describing these additions. This *Supplement* is intended to include these, as well as certain species which were omitted in the *Flora*, and forms a most valuable contribution to North American botany. It contains 96 pages, with index, is printed in the same form and type as the *Flora*, and is paged in continuation with the latter, making a total of 698 pages. Seventy-eight genera are added to the *Flora*, and about 450 species and varieties are described. Some of these, however, must count as corrections to the first edition. *Scutia ferrea* is *Reynosia latifolia*, Griseb., in the *Supplement*; *Gallactia spiciformis*, var., is *G. filiformis*, Benth.; *Schœnolirion Michauxii* is *S. Elliottii*, Feay; *Panicum sanguinale*, var., is *P. serotinum*, Mx., and *Andropogon tetrastachys*, var., is raised to the rank of a species under the name of *Andropogon arctatus*, Chapman.

The following are proposed as new species: *Polygala Reynoldsæ*, Chapm.; *Petalostemon Feayi*, Chapm.; *Pinguicula Floridensis*, Chapm.; *Euphorbia Garberi* and *deltoidea*, Engel., ined.; *Croton Alabamensis*, E. A. Smith, ined.; *Tillandsia Houzeavi*, Morren, ined.; *Xyris setacea*, Chapm.; *Paspalum reismarioides*, Chapm., and *Andropogon maritimus*, Chapm.

Seven genera and fifty-five species of grasses are described. "*Pharus latifolius*, L. (?)," from the description, must be *P. glaber*, Kth. (*P. latifolius*, Trin., non L.); "*Sporobolus Domingensis*, Sw.," was distributed in Mr. Curtiss' sets as *S. purpurascens*, Hamilt. Although synonyms are very generally cited, adding much to the value of the work, they are omitted in the case of *Thurberia Arkan-sana*, Benth., a grass long known under the names *Greenia*, Nutt., and *Sclerachne*, Torr. "*Paspalum monostachyum*, Vasey, ined.," was referred by General Munro to *P. rectum*, Nees., "*spicis longiore*." "*Paspalum obtusifolium*, Raddi," No. 3,565 of A. H. Curtiss, is *P. platycaule*, Poir. No. 813 of E. Hall's Texan collection is the same.

A very satisfactory attempt is made to separate the various forms of *Panicum* that have been lumped together under *P. dichotomum* by Dr. Gray and others, and the following are recognized as species:

Panicum commutatum, Schultes (*P. nervosum*, Ell.), *P. sphaerocarpon*, Ell., *P. consanguineum*, Kth. (*P. villosum* and *angustifolium*, Ell.), *P. laxiflorum*, Lam., and *P. ramulosum*, Mx., in part.

In the first edition, *Andropogon maritimus* was included in *A. scoparius*, with which it is closely allied. It is, however, a well-marked species. Mr. Isaac Burk has collected this grass at Cape May, New Jersey, and specimens of it are in hand.

The gentlemen who, from the frequent mention of their names, seem to have been most active in the discovery of the plants enumerated in the Supplement are Dr. A. P. Garber (since deceased), Messrs. A. H. Curtiss and Charles Mohr and Dr. Gattinger. Credit is due the two first named for the discovery of the greater part of the 180 species found only in Florida.—F. L. S.

Origine des Plantes Cultivées. Par Alph. De Candolle. 8vo., pp. 377. Paris: Germer Baillière et Cie. 1883.

Michigan Agricultural College. Report of the Professor of Botany and Horticulture for 1881 and 1882. By Dr. W. J. Beal. 8vo, pamph., pp. 57.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College Tuesday evening, Jan. 9th, the Vice-President presiding.

The Herbarium Committee reported contributions to the herbarium from Messrs. Day and Britton.

The Librarian read the titles of the books and periodicals that had been received since the last meeting.

This being the Annual Meeting, the Treasurer presented his report for the preceding year.

The New Jersey Flora.—Mr. Britton exhibited specimens of *Rudbeckia speciosa* and *Senecio tomentosus*; the former found in Cumberland County, N. J., by Mr. Commons, and new to the State, and the latter found by the same gentleman at Cape May, and by Mr. C. A. Gross at Landisville.

Albinism.—White-flowered forms of *Habenaria psycodes*, *Sisyrinchium Bermudiana* and *Cirsium arvense* were shown by Prof. Day.

New New York Stations.—Mr. Willis gave Mt. Kisco as a station for *Potentilla fruticosa*, a plant new to the Westchester County flora. Mr. Britton reported a locality near East Chester, on the Boston Turnpike, as a new station for *Leontodon autumnale*.

Officers.—The following officers were elected for the present year: President, J. S. Newberry; Vice-President, Addison Brown; Recording Secretary, Arthur Hollick; Corresponding Secretary, Benjamin Braman; Treasurer, W. H. Rudkin; Editor, W. R. Gerard; Associate Editor, N. L. Britton; Librarian, N. L. Britton; Curator, P. V. Le Roy.

One corresponding member was elected.

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[No. 4.]

Notes on the Haustoria of some N. A. Parasitic Phanerogams.

By JOS. SCHRENK.

(Plates XXXI-XXXIII.)

COMANDRA UMBELLATA, Nutt.—The following description of the haustorium of *Comandra* is based on specimens that grew on the roots of *Aster Tradescanti*, L. The figures on the accompanying plates (except Fig. 5), were all drawn from such haustoria; those from other dicotyledonous foster-plants, however, are not at all essentially different. In Figs. 3, 6 and 8 the outlines of the various tissues are magnified 80 times, while the individual cells are made to represent the type of those tissues by employing higher powers. In the figures of the other sections the cells appear magnified about 500 times, and the perspective illustrations of the entire haustorium with its foster-root, Figs. 1a, 1b, and 2a, 2b, 8 and 12 times respectively. For the sake of brevity, I shall, with reference to the foster-root, call the sections represented by Figs. 3, 6 and 8 respectively, the longitudinal, the transverse, and the tangential (the last being a cross-section of the haustorium itself).

The *haustoria* (suction-organs) of *Comandra* grow on thin, short branches of the root, and usually appear as if stalked. Sometimes they seem to be terminal (Fig. 2a), but their internal structure, as well as the common mode of their growth, illustrated by Fig. 1a, show that they are lateral organs. The rootlet bearing the haustorium may run parallel with the foster-root (Fig. 1a), or in a different direction (Fig. 2a). The form of the haustoria is half-ellipsoidal or bell-shaped, somewhat laterally flattened, the longer diameter of their cross-section being parallel with the axis of the foster-root. Their size varies according to age and other circumstances. The smallest are quite minute; the ones figured on the plates (a little over 1^{mm} high and about 1.5^{mm} wide), I found to be of a common size, but there are some that are twice as large, or even larger.

Viewed externally, the haustorium appears to grasp the root of the foster-plant as a hand, deprived of its thumb, would grasp a large cylindrical object; or, still better, as one's lips would take hold of a finger-joint to suck the blood from a wound (Figs. 1a, 1b, 2a, 2b).

In describing the structure of the haustorium, we have to distinguish the interior tissues, which penetrate into the body of the foster-root, from the external covering. The latter, which we might call the *bark* of the haustorium (*b_k* in all the figures), reaches from the top of the haustorium to the bark of the foster-root, which it partly encircles, thus playing the part of the lips in the above comparison. At its lower edge, we find a number of papillose cells, reaching, or

endeavoring to reach, the surface of the foster-root (Fig. 3). This "bark" consists of large, rounded, parenchymatous cells, which are usually distorted or torn at the outer surface, and in the vicinity of certain cavities, which will be mentioned hereafter. It is often formed of two or more shell-like layers, which grow successively longer, overlap one another, and thus make the surface of the haustorium appear as in Fig. 1a.

Under this outer covering there is a zone of oblong, prismatic cells, that are radially arranged in several close rows (*pc* in Figs. 3 and 6). This tissue does not penetrate into the foster-plant; we do not notice it in a tangential section taken as deep as the one in Fig. 8, but in sections higher up toward the top of the haustorium it is always seen encircling the central portion. Its peculiar cambium-like structure, and the manner in which the cells outside and inside of it seem to proceed from it, induce me to consider it as a kind of meristem from which, on one side, the bark (eventually with its successive layers) may originate, while on the other it may contribute to the development of the parenchymatous outer part of the central portion.

Very often there are empty spaces, caused by the stretching and tearing of the tissues, between the zone of prismatic cells and the bark (Fig. 6, *sp*), and also between the successive layers of the bark. Besides, an empty space is usually to be found extending along the curved surface of the foster-root, where the bark is attached by a few rows of cells only (Figs. 6, *sp* and 8, *sp*).

The *central portion* of the haustorium, which lies within the two zones described, and enters the body of the foster-root, consists of several distinct kinds of cells. Most conspicuous among them by their reticulated walls, their zigzag course and peculiar arrangement, are the vascular cells (*vc* in all the figures). They arise singly (Fig. 8), or in groups (Figs. 8 and 3), either at the apex of the haustorium, closely attached to the vessels of the foster-root, often even entering them, or at some distance from them. Continuing their course in zigzag lines they meet other vessels of the same kind, and unite with them in bundles, the butt ends of which form a rather compact ring in the centre of the haustorium. From the different groups of this ring, numerous *single* ducts proceed upward and converge into a large bundle, more or less distinctly divided longitudinally into two halves, and finally join the plerome of the *Comandra* rootlet (see Fig. 3, and for the upper half, Fig. 6). It usually happens that a zone around the lower part of the vertical axis of the haustorium contains no vessels. (Figs. 6 and 8). In Fig. 6, therefore, we see no vascular cells in the lower half, except a small portion of an arc (joining two groups of vessels) which was sliced off by the knife.

In the upper part of their course the vascular bundles are enclosed by a few rows of elongated, narrow prismatic cells (see Fig. 6), which are similar to the prismatic cells inside of the bark, but are much narrower and with thinner walls. There is little doubt that they perform the functions of the cambium of stems and roots.

Another kind of elongated (but not prismatic) active cells accom-

panies and surrounds the vessels in their lower course, where, in fact, they form the bulk of the haustorium (*ac* in all the figures). The transformation of these cells into vessels by the deposition of the reticulated thickening on the cell-wall, and the subsequent union of several cells into one duct, can be plainly traced.

The space in the central portion not occupied by the tissues mentioned is filled with a ground tissue of parenchymatous cells, not unlike those of the bark in form, but, for the greater part, of smaller size (*gt* in all the figures). In the lower half, especially in close proximity to the foster-root, these cells become also narrow and elongated. But at the two lateral extremities, where they curve outward to insert themselves longitudinally between and into the cells of the foster-root, many of them assume an inflated, club-shaped form (at *x* in Fig. 3, *gt* in Figs. 4, 8 and 10).

In all the sections we notice peculiar, striate bands dividing the parenchymatous tissue into shell-like layers (*ss*). Along these bands, cavities like those between the bark and the zone of prismatic cells are frequently met with, as in Figs. 3, 6, and 8. Similar structures were called "stripes of separation" by Solms-Laubach in his excellent description of the haustorium of *Thesium*, the Old World near relative of our *Comandra*.^{*} Solms-Laubach has shown that they consist of parenchymatous cells, crowded together and crushed by the multiplying neighboring cells into a compact mass, in which the component individual cells are recognizable only with difficulty or not at all. As these notes are to furnish merely an anatomical description, I will reserve my opinion in regard to the origin of these "stripes," and will simply state that in *Comandra* they seem to be of a more complex nature than in *Thesium*; for, in the former, we find them not only in more or less concentric zones, as in *Thesium*, but every larger group of vessels with meristem tissue appears partly surrounded by such a shell of compressed cell-membranes.

The difference in the manner in which the cells of these two parasites are attached to those of their foster-plants deserves special attention. Solms-Laubach says (*l. c.* p. 545) that the terminal cells of the haustorium are *separated* from those of the foster-plant by an irregularly developed layer of a homogeneous, yellow mass, possessing high refractive power; and (p. 547) that this mass is evidently intended to *isolate* the haustorium from its foster-root, and that wherever this mass is but poorly developed or entirely wanting, the foster-root endeavors to replace it by producing a more or less massive corky layer. In the haustorium of *Comandra* I could detect no such mass nor any corky layer. Figs. 4, 5, 7, 9 and 10 show the points of contact in sections carried out in the three principal dimensions.

Fig. 4 is a longitudinal section, showing a group of cells from the vicinity of the point *x* in Fig. 3. Three cells, *gt*, belonging to what I have called the ground-tissue of the haustorium, enter some phloëm of the *Aster* root; the walls of all the cells can be plainly distin-

^{*} Hermann Graf zu Solms-Laubach, über den Bau und die Entwicklung parasitischer Phanerogamen, in Pringsheim's Jahrb. für wissenschaft. Bot., Vol. vi.

guished without any intervening substance between them. The same is the case in Fig. 5, taken from a longitudinal section of a *Comandra* haustorium on a *Vaccinium* root. The location of this group of cells corresponds to the point *y* in Fig. 3. Here one cell of the parasite, having struck a tracheid of the *Vaccinium* at right angles, has penetrated it, and within its cavity has formed a peculiar, capitate expansion. The other *Comandra* cells are about to break through the wall, while the adjoining cells of the foster-plant have already been partly disintegrated.*

Fig. 7 represents a cross-section of some vessels that have been entirely separated from the plerome of the *Aster* root by the rapidly growing apex of the haustorium, which, like a wedge, exerts a downward and sidewise pressure. Some of the cells (pitted vessels) are very much indented or compressed laterally. The same group, less magnified, will be found in Fig. 6, and another similar one, on the other side of the same haustorium. In this case, too, the cells of the parasite are seen in *close contiguity* with those of the foster-root.

Fig. 10, from a point *z* in the tangential section, Fig. 8, shows some cells of the parasite, that have descended vertically, and then have curved outward, to the right (compare Fig. 3), as they meet a large pitted vessel of the *Aster* and crowd into it, their walls closely pressing against those of the vessel. Some other descending cells are breaking the connection between this cell and the neighboring one.

A similar vascular cell of the *Aster* root, from a place corresponding to the point *w* in Fig. 8, but somewhat nearer to the apex of the haustorium, is shown in Fig. 9. It has been detached from the other vessels and is now wedged in between the actively growing peripheral and central cells of the interior haustorium. This figure, at the same time, explains the structure of the "stripe of separation," ss. We see the cells on both sides of it, but especially toward the circumference, yielding to the expansive force of the haustorium, and we can easily imagine that some of them will soon be totally crushed, and that their membranes will help to increase the mass of the "separation stripe." We also notice, at *bk*, some layers of bark-cells. They appear very much reduced in width, the innermost exceedingly so. Using a lens of lower power we might easily take this layer of partly and totally collapsed cells for the "homogeneous, yellow mass" spoken of above, especially after treating the section with alkalis for the purpose of making it transparent.

I think what I have said in explaining the five last figures will be sufficient to show that, in *Comandra*, there exists a direct and unobstructed communication between the cells of the haustorium and those of its foster-root.

Hoboken, March, 1883.

Aspidium Lonchitis, Swz.—The range for this fine fern is now extended to California, it having been collected by Mr. Pringle at Castle Lake, Siskiyou Co., September 5, 1882.

GEO. E. DAVENPORT.

* By the shading it is simply intended to show the wall of the tracheid respectively.

New Plants.

By EDWARD LEE GREENE.

(*ENOOTHERA* HILGARDI. — Annual, canescently puberulent, 3–6 inches high, divaricately much branched; leaves linear, spatulate, entire, 1–2 inches long, including the petiole, the lamina deflexed; branches corymbose in flower, densely spicate in fruit, the spikes leafy; petals $2\frac{1}{2}$ lines long, obovate, entire; capsule $\frac{1}{2}$ inch long, straight, sharply angled, attenuate from base to apex; seeds strongly clavate, pale, smooth and shining.

Collected on moist alkaline soil of the Klickitat Swale, Washington Territory, in July, 1882, by Prof. E. W. Hilgard.

It is nearly related to *Æ. andina*, Nutt., but is a larger plant, with a depressed habit of growth, much larger flowers, sharply angular capsules, and clavate seeds. The seeds of *Æ. andina* are linear-oblong, darker colored, and not so smooth.

(*CORETHROGYNE* DETONSA. — Suffrutescent (?), branches very leafy up to the base of the loose panicle; leaves sub-coriaceous, oblong-oblancoate, 2–4 inches long, their whole margin coarsely serrate-toothed, densely white tomentose beneath, less so above, the uppermost linear-oblong and finely serrate; involucre large, campanulate, of numerous, rigid, densely woolly scales, in many ranks; receptacle without chaff; style-tips without bristles, but coarsely short pubescent under a lens.

The single rigid, leafy branch, apparently that of a more or less shrubby plant, is in the herbarium of the California Academy, without a note to indicate whence or through whom it was obtained. Though unmistakably a *Corethrogyne*, it lacks the main technical character of the genus, *i. e.*, the bristly style-tips; or at least the long bristly hairs of the other species are, in this, shorn down to a mere pubescence, which is not apparent to the unaided eye. The specimen has the appearance of being very old, and may have come from some island of the Californian coast long ago.

(*ENCELIA* STENOPHYLLA. — Shrubby, glabrous and apparently somewhat glutinous; leaves two or three inches long, narrowly linear, entire, crowded on the branches; heads small, rather numerous, in a rather close and mostly long-peduncled corymb; involucre less than half the length of the disk, its closely imbricated scales lanceolate, with sparingly hispid-ciliate margins; akenes cuneate-obovate, densely villous throughout, each margin bearing a stout awn.

Collected many years since on the Cedros (wrongly written "Ceros") Islands, by Dr. Veatch, whose copious specimens have remained in the herbarium of the California Academy of Science, hitherto unnoticed.

(*HEMIZONIA* (HARTMANNIA) KELLOGGII. — Diffusely paniculate, 1–3 feet high, stout and somewhat hispid; cauline leaves pinnatifid, 1–3 inches long; those of the branchlets smaller and entire; heads numerous and scattered, of 5–6 ray- and only 3–4 disk-flowers; both stipe and beak of ray-akenes very prominent and strongly bent; pappus of disk-akenes mostly united at base, or even to the middle, forming a tube.

Very abundant, according to the observation of Dr. Parry and myself from the railroad cars, throughout the region of the lower San Joaquin, yet not appearing to have been collected except by Dr. Kellogg, whose labels say "Near Antioch, on dry hills, April 22d, 1870," and who referred the plant to *H. fasciculata*, the more branching states of which it well resembles; but the much larger size, and different habitat, and more especially the very prominent stipe of the ray-akenes, and the united scales of those of the disk, show it easily distinct.

ARTEMISIA (ABROTANUM) FRANSERIOIDES.—Stems two or three feet high, solitary, from a perennial root; leaves bipinnatifid, broad and very large, the lower and those of sterile offshoots often 6 to 10 inches long (including the petiole) and two-thirds as broad, the upper gradually reduced and those of the long, narrowly racemose panicle simple, lanceolate, all of very thin texture, green above and pale beneath with a very minute, appressed tomentum; heads very large, nodding; scales oblong, obtuse, with sparingly lacerate-ciliate, scarious margins, and the greenish back dotted with roundish, white glands; receptacle conical; corolla glabrous; style-tips truncate, densely panicillate.

In deep shady woods of *Pseudotsuga* near the summits of the Pinos Altos Mountains, New Mexico, flowering in the middle of September, 1880; pleasantly fragrant and rather handsome, with the aspect of certain species of *Franseria*. Dr. Gray informs me that it has been collected by Gunnison, in Colorado, and by Rothrock, in Arizona, and that it was referred to *A. discolor*.

Two New Species of Grasses.

By GEORGE VASEY.

STIPA STRICTA.—Culms 1 to 1½ feet high, erect, slender; radical leaves setaceous, more than half as long as the culm; cauline leaves 3 or 4, the lower 5 to 6 inches long, the upper short, its sheath dilated and enclosing the base of the panicle, ligule very short; panicle 4 to 8 inches long, strict, erect, the lower rays in twos or threes, above single, appressed, one an inch long, the other nearly sessile; outer glumes narrowly lanceolate, acuminate, 3-nerved, thin; flowering-glumes about 3 inches, including the stipe, pubescent all over, awn 10 to 14 inches long, twice bent, the lower half strongly pubescent, but not plumose.

Oregon, W. N. Suksdorf, and through the Sierra Nevada Mountains.

It has been mistaken for *Stipa occidentalis*, which has longer plumose awns, broader 5-nerved glumes, a conspicuous ligule, and a shorter, looser panicle. It differs from small forms of *Stipa viridula* in the shorter, more slender culms, shorter rays of the panicle, narrower glumes and shorter awns.

ARISTIDA PALMERI.—Culms erect, slender, 1½ to 2 feet high, smooth, simple or branched at the base; radical leaves very short, setaceous; cauline leaves 4 or 5, somewhat equidistant, 2 to 4 inches long, ligule a ring of short ciliate hairs; panicle 6-10 inches long,

erect, the branches mostly in pairs, 2 to 3 inches long, becoming divergent, below sheathed in the upper leaf, sparingly flower-bearing above the middle, branches and pedicle slightly scabrous; spikelets, including the awns, 9-10 inches long; glumes 4 to 5 lines long, nearly equal, narrow, 1-nerved, acuminate, slightly scabrous on the keel, rather shorter than the flowering-glume, which is 5 to 6 lines long, including the short pubescent stipe, narrow, smooth, the awns nearly equal, 5 to 6 lines long, erect.

Collected in Southern Arizona in 1869 by Dr. E. Palmer.*

A New Ramalina.

By EDWARD TUCKERMAN.

RAMALINA CRINITA, *sp. nov.*—Thallus caespitose, rigid, compressed, sub-dichotomous, linear-laciniate, at length much dilated, greenish-glaucous, the divisions smooth, interruptedly white-striate, and becoming lacunose, attenuate at the summits, and clothed at the margins more or less thickly with strong, solitary or clustered, finally branched, black fibrils; apothecia middling-sized to large (3-10^{mm}. in width), subterminal and lateral, subpedicellate, varying as to smoothness as the thallus, the margins blackened; spores oblong-ellipsoid, $1\frac{1}{2}$ -2⁰ mic. 2

On low shrubs of *Euphorbia misera*, in company with *Roccella leucophaea*, *Physcia erinacea*, etc., on the coast, San Diego, California, C. R. Orcutt, in herb. Sprague; found also by the same collector, at Todos los Santos, Lower California; spermogones not observed. In the only other known species comparable with this, inasmuch as the slender divisions pass above into, and are beset with black fibrils (*R. melanothrix*, Laur., known only from the Cape of Good Hope, Drège!) the spermogones are described as black. The tufts of our plant vary from one and a half to three inches in height in the specimens seen as yet, and the width of the divisions from 2^{mm}. to more than an inch. The general aspect of the lichen suggests the stock of *R. calicaris*.

Notes on the Adirondacks.—The recent action of the Legislature having brought the great North Wilderness into prominent notice, some general notes made on a recent hurried journey through a portion of that region may not be devoid of interest. Commencing at North Creek, some sixty miles by rail from Saratoga, a stage journey of twenty miles, followed by a buck-board progression—one could hardly call it a journey—of ten miles further through a wooded and broken country, brings us to Blue Mountain Lake. This sheet of water, with its irregular and deeply indented shores and numerous islands, is perhaps the most picturesque of the almost numberless lakes which constitute so prominent a feature of the whole region. The vegetation of

* I have a letter from Mr. Suksdorf, of Washington Territory, in which it is stated that Mr. Howell is entitled to the credit of the discovery of *Agrostis humilis* (described in the February number of the BULLETIN), although he (Mr. S.) also collected on the same mountain—*Paddo* being the Indian name for Mt. Adams.—G. V.

the locality is varied, apparently representing a large number of species common to the Northern and Eastern States; but its whole aspect indicates a severe climate and sterile soil. A notable feature at the time of our visit, August 15th, was the wonderful size and abundance of the fruit of many species. Everywhere on lower ground was *Cornus Canadensis*, with bunches of bright red berries, making the ground in places fairly brilliant. Many of the plants were also in bloom, but the depauperate appearance of the flowers showed them to be plainly out of season. *Clintonia borealis*, though less abundant, was even more striking. Here and there it occupied the ground in patches, to the exclusion of nearly all other plants, while every scape bore several, often a half dozen, berries usually a half inch or more in diameter. The color was of the intensest cobalt-blue, which to my knowledge is not anywhere equalled in fruit or flower. Other species also remarkably conspicuous for their fruitfulness were *Streptopus roseus*, *Medeola Virginica* and *Trillium erythrocarpum*. A number of species, which, further South are found only in swamps, were seen flourishing here on steep and comparatively dry hill-sides. Among undershrubs, *Viburnum lantanoides* was very abundant, and, on lower ground was everywhere laden with great broad cymes of beautiful coral fruits. Far up the mountain-side the plants were still abundant, but bore no fruit.

The ascent of Blue Mountain, instructive in the opportunity it affords for the study of mountain vegetation, offers a perhaps still greater reward in the way of magnificent scenery. The mountain is about 4,000 feet in height, and stands comparatively isolated in a vast amphitheatre of hills and low mountains. A forest stretches in every direction, apparently unbroken except by the lakes and ponds of various sizes, of which about twenty are in sight. In general aspect the forests appear to be made up largely of conifers, but a closer inspection shows that such is not the case. Indeed, nowhere in the Adirondack region did I encounter any exclusively coniferous forests, or any where the conifers were not equalled in number by broad-leaved species. The grand feature of the view from the summit of Blue Mountain, however, is the group of mountains of which Mt. Marcy is the centre, lying some thirty miles to the east. Few mountain views, I apprehend, are grander than this.

On the few acres of cleared land in the vicinity of Blue Mountain Lake it was interesting to note the promptness with which nature sets about clothing the open spaces with vegetation. Left to itself for a single year, a clearing, especially if it has been burned over, yields a luxuriant crop of the two fire-weeds, *Epilobium angustifolium* and *Erechtites hieracifolia*, the former largely in excess. In clearings two or three years old, as also along the sides of roads, *Prunus Pennsylvanica* begins to appear in great abundance. Many of the plants were fairly vigorous, while a large number was seriously affected by the black-knot. So far as these clearings are intended to give space for cultivated fields, they appear altogether unpromising, judging by the few efforts at gardening here and there visible. Whatever else may be in store for the wilderness as a whole, it is safe to

predict that no considerable areas will ever be devoted to agricultural purposes.

A canoe journey through Blue Mountain, Raquette and Long Lakes and connecting streams and ponds, is an event of rare interest. The vegetation of the shores is everywhere sufficiently attractive, but one's interest and admiration culminate at various points along Raquette River. Nowhere have I ever seen more beautiful natural planting. Very often the commingling of the vegetation is such as to produce the most striking effects, which linger long afterwards as pleasant pictures in the memory. At certain especially noteworthy spots the principal species on the river banks appeared to be *Acer dasycarpum*, *Pyrus Americana*, *Abies balsamea* and *Lobelia cardinalis*. The maples, of rather small size and bushy form, were in greatest numbers. Mingled with these were shrubby forms of mountain ash with branches appearing like fronds, and producing an airy and graceful effect; and the back-ground was filled in with rather sombre but beautiful specimens of balsams, while in front of all and close to the water's edge were great masses of luxuriant cardinal flowers laden with a profusion of bloom.

Of the numerous aquatic species encountered, none was more attractive than the water-lilies. The patches met with here and there presented marked differences in the size and color of the flowers, the size and general appearance of the leaf, and in the whole aspect of the plant. The forms in the Raquette system of lakes and streams answered best to the descriptions of *Nymphaea odorata*, while after crossing the divide at Stony Creek and entering the Saranac system all the plants observed answered more nearly to *N. tuberosa*. The whole appearance of the Nymphæas was such as to suggest the need of a modification of the description of the species as now given, and perhaps the recognition of several well marked varieties.

The wise action of the Legislature in refusing to sell any more of the nine hundred square miles still owned by the State in the Adirondacks ought to be supplemented by the purchase of perhaps an equal area, or at least by the passage of a law securing its control, so that the further removal of timber may be prohibited, or at all events properly regulated. Perhaps the greatest damage to the natural beauty of the region has thus far resulted from the damming up of streams and the outlets of lakes. The object is sometimes to facilitate the getting out of timber, at others to deepen the water so as to permit the use of small passenger steamers, which are unhappily becoming quite numerous. In either case the result is the permanent flooding of the banks and the death of all timber on the flooded areas. Even some parts of the beautiful Raquette have been already doomed. The devastation from this source ought also to receive legislative attention, and be as far as possible prohibited. In general, it seems to me that the vast importance of the Adirondack forests to the State, and the irreparable injury, even from the utilitarian standpoint alone, which their destruction would bring, has never been overstated, or even fully stated.

Cornell University, Ithaca.

A. N. PRENTISS.

Notes from Central New York.—*Equisetum littorale*, Kühlewein, discovered by Mr. Pringle on the shores of Lake Champlain, Vt., grows very abundantly at the foot of the high shady banks of the Oswego river, just this side of the Oswego Water Works Company's pump-house. The locality, being saturated continually from the Company's reservoir above, is entirely covered with the light green, branched stems of this long, tender *Equisetum*. I found good specimens in fruit as late as the middle of October. I have no doubt that the plant grows farther up the river, above Minetto, where the low shores are covered with *Hydrocotyle umbellata*, L., and where I found, between the island and the canal, a beautiful specimen of *Lythrum alatum*, Pursh.

Since the only locality for *Eleocharis quadrangulata*, R. Br., at the outlet of Oneida Lake, is exhausted, it will prove of interest to botanists in this State to learn of another station for it, this being six miles east of this city, at Paddy's Lake, near South Scriba P. O. On the eastern shores of this lake, where the water is shallow, this rare rush fills the water and forms a safeguard for *Bidens Beckii*, which grows in the deeper water behind it. Here I found a monstrous form of *Nymphaea tuberosa*, Paine. There were 3-4 perfect flowers, each with green sepals and white petals, upon one stem and within the usual flower, on different plants.

Potentilla recta, L., dropped from the later editions of Gray's Manual, is perfectly naturalized east of the city, along roadsides and in pastures, along with *Hieracium aurantiacum*, L. I have found specimens of both these plants even as far as four miles out in the country.

Coreopsis discoidea, T. & G., abounds on the borders of a pond on Lake Ontario, three miles north-east of the city, where are also found *Cakile Americana*, *Euphorbia polygonifolia*, *Lathyrus maritimus*, *L. palustris*, *Artemisia Canadensis* and *Sporobolus cryptandrus*.

Scirpus lacustris, L., var. *occidentalis*, Watson, grows on the sandy shore of Lake Ontario, west of Twelve-mile Bluff, on the border of a small pond.

To the many rare plants found in Lodi Swamp, Syracuse, N. Y., I may add: *Solidago linoides*, Solander, *S. neglecta*, Torr. and Gray, *S. Ohioensis*, Riddell, *Viola renifolia*, Gray, *Valeriana sylvatica*, Richards, *Tofieldia glutinosa*, Willd., *Arethusa bulbosa*, L., and *Mitella nuda*, L. I think this is the most interesting small swamp, for botanists, in Central New York, but, alas! the new West Shore Railroad and the growth of the near city will soon destroy this little botanical paradise.

The much talked of "Cicero Swamp," some six or seven miles north-east of Syracuse, was visited by me in July last. This dismal forest, visited only by berry-pickers in the fall, and lumbermen in winter, does not pay for the trouble and danger that it requires to obtain access to it. Such plants as grow there (*Woodwardia Virginica*, orchids, *Dalibarda*, etc.) can be found easier in more accessible localities, and far from the numerous rattlesnakes of that green desert, from out of which even an expert guide succeeded in finding his way only by listening for the sound of a locomotive whistle on the

Central Railroad. Great Latin orator, what a disgrace to your immortal name!

Oswego, N. Y.

J. H. WIBBE.

Notes on the Coniferæ of Washington Territory.—The following observations are limited to the eastern slope of the Cascade Mountains, between the parallels of $46^{\circ} 30'$ and $47^{\circ} 30'$ north latitude. It is difficult to give any fixed altitudes for the range of a species, as this is in a great measure regulated by the amount of moisture, these two factors of altitude and moisture combined determining the composition of the forests in the different localities. The damp winds from Puget Sound, after passing over the crest of the mountains, are gradually deprived of their moisture until, at a distance varying from thirty to forty miles from the summit, the soil becomes too dry to support a growth of timber. This line between the forest and sage-brush areas varies in altitude from 1,500 feet, along river valleys, to 3,000 feet. The lowest and perhaps the most extensive, at least the most valuable forests, consist of an open growth of yellow pine (*Pinus ponderosa*, Dougl.) and Douglas spruce or yellow fir (*Pseudotsuga Douglasii*, Carr.), the former extending to an altitude of 4,500 feet, and in dry situations even to 5,000 feet, while the latter ranges somewhat higher. The yellow pine is never found in the denser and damper forests towards the summit, even at as low an elevation as 3,000 feet. The whole timbered area can be well divided into the lower and dry or yellow pine forest, and the upper and damp or fir (*Abies*) forest. The term upper in this sense means proximity to the summit rather than altitude. Probably nine-tenths of the upper area are composed of fir—*Abies grandis*, Lindl., (white fir) first appearing, then becoming mixed with *Abies amabilis*, and finally the first species disappearing and the latter forming the bulk of the forest area at the summit. Another species of fir probably occurs here, *Abies concolor*, Lindl., or perhaps *A. subalpina*, Engelm., but its distribution was not well determined. A few trees of *Abies nobilis*, Lindl., (red fir) were seen near Natches Pass at an elevation of 6,000 feet. *Pinus contorta*, Dougl., var. *Murrayana*, (black pine, tamarac) grows throughout the upper yellow pine area. In this situation it often forms dense thickets, the trees being small and with trunks as straight as arrows. The black pine is also often seen on high exposed summits with *Pinus albicaulis*, the latter ranging higher than any other of the coniferæ of the region, except perhaps *Juniperus communis*, L., var. *alpina*, (juniper) which carpets the alpine peaks. The white pine (*Pinus monticola*, Dougl.) is found scattered throughout the upper yellow pine and lower fir forests, and the beautiful light green foliage of the larch (*Larix occidentalis*, Nutt.) is often a conspicuous object at low elevations. *Picea Engelmanni*, Engelm., (spruce) is often a companion of the fir at high elevations, but is rather local in its distribution. The two hemlocks of the region, *Tsuga Pattoniana* and *Tsuga Mertensiana*, Carr., the latter much resembling the eastern species, *T. Canadensis*, Carr., grow through the upper fir forests. The cylindrical, oblong cones of the former are, after falling, very conspicuous by their reflexed scales. The yellow or Sitka cedar (*Chamaecyparis Nutkaensis*, Spach.) is a middle-sized

tree along streams and on lake shores, but on high exposed summits at over 6,500 feet it is hardly more than a shrub, and forms dense thickets. The arbor vitæ, the red cedar of Oregon (*Thuja gigantea*, Nutt.) is the largest tree of the region, some specimens being over ten feet in diameter. The yew (*Taxus brevifolia*, Nutt.) is frequently seen in the dense damp forests, but rarely exceeds a height of 25 feet. Some few specimens of *Juniperus Virginiana*, L., (red cedar) were seen at low elevations. The main summit of the Cascade Range, in the region where the above observations were taken, has an altitude varying from 6,000 to 6,800 feet, and is generally bare of timber. Its immediate slopes are covered with grass and flowers of every hue interspersed with bunches of willows and groves of fir.

Newport, R. I.

FRANK TWEEDY.

Fasciation in *Rubus*.—A curious case of fasciation was brought to my notice a short time since. The specimen was a cane of the cultivated black-cap raspberry, which, at the extremity, had become strongly flattened and coiled upon itself in the form of a flat spiral. The width of the cane was seven-eighths of an inch, and the thickness about one-third of an inch near the outer circumference of the coil, while on the inner side it was much thinner. The four complete coils were from one and one-half to three and one-half inches across. From the beginning of the first coil the cane bore an unusual number of abortive foliar organs, which increased in number toward the extremity until the entire tip was of a thickened and foliaceous character.

A cross-section of the cane showed it to consist of two regions of entirely different tissue. The thickened portion which followed the periphery of the curve was of normal woody structure, while the opposite side was composed almost entirely of parenchyma. This differentiation of tissues, with their unequal rates of growth, doubtless explains the phenomenon of curving. The coil became more distinct and its radius shorter as the difference between the two regions became more marked, until, at the extremity, the parenchyma predominated and expanded into a sort of flattened membrane. At the time of collection the woody region was still fresh and active, but the parenchyma was dead and withered. This, no doubt, assisted in the curvature, since several transverse fissures across the parenchyma showed that it had been subjected to considerable tension.

I believe the cultivated species of *Rubus* are especially liable to oddities of growth, but I have never seen so striking a departure as this before.

Houghton Farm, Mountainville, N. Y.

W. E. STONE.

Genus Labels.—Mr. H. N. Patterson, of Oquawka, Ill., desires us to state that the first box of his North American genus-labels, from Ranunculaceæ to Compositæ, 650 genera (3 of each), is now ready for delivery. Price \$1.30.

Note.—We send out with this number three plates, which are to be substituted for the badly printed ones that accompanied our March issue.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.]

New York, May, 1883.

[No. 5.]

New North American Fungi.

By G. WINTER.

Ends

PLEONECTRIA DENIGRATA, Winter, *nov. spec.*—Perithecia caespitulosos, densissimos, errumpente-superficiales, pulvinato-subhemisphaericos, usque 5^{mm} diam., metientes formahtia, stromatis pulvinati, intus rufescenti-lutei superficie insidentia, fere globosa, extus grisea, eleganter nigro-papillata, demum vertice depressa et umbilicata, nigrescentia, 360–470 μ diam. Asci cylindranei, breviter pedicellati, 8-spori, ca. 70 μ longi, 8–10 μ crassi, (in aqua demum usque 110 μ elongati). Sporae plerumque monostichae, valde diffformes, rotundato-angulatae, 3–5 plo transverse septatae et muriformes, ad septis plus minus constrictae, pallidissime flavidulae, 10–16 μ longae, 7–10 μ crassae. Paraphyses filiformes, longissimae.

In ramis corticatis *Gleditschiae triacanthi* prope Lexington, Ky., June, 1882; legit W. A. Kellermann. (No. 9.)

CALLORIA RUBRO-COCCINEA, Rehm et Wint., *nov. spec.*—Apothecia sparsa vel gregaria, sessilia, patellariformis, rubro-coccinea, sicca urceolata varioque modo plicata, humida explanata, 1–3^{mm} diam. Asci clavati, apice incrassati, 8-spori, 40–45 μ longi, 5 μ crass. Sporae clavatae, hyalinae, unicellulares, submonostichae, 12–15 μ longae, 3 μ crassae, hyalinae. Hymenium dilute rubro-coccineum, in lamellis tenuissimis, fere hyalinum.

In ramis *Gleditschiae* cum antecedente.

DIAPORTHE KELLERMANNIANA, Winter, *nov. spec.*—Stroma nullum. Perithecia profunde immersa depresso-globosa, membranacea, atra, 210–260 μ lata, errumpente praedita. Asci oblongo-fusoidei, 8-spori, 35–40 μ longi, 5–7 crassi, sporae oblongae, saepe inaequilaterales, utrinque rotundatae vel parum acutiusculae, medio uniseptatae, non constrictae, 4-guttulatae, 9–11 μ longae, 3–3.5 μ crassae.

Ad *Zea Maydis* culmos putridos prope Lexington. Dr. W. A. Kellermann, cui hanc speciem dedicavi. (No. 2.)

PHYLLOSTICTA PODOPHYLLI (Curtis), Winter.—(Synon.: *Ascospora Podophylli*, Curtis, in 23 Rep. of the New York State Cabinet, p. 65, sec. Cooke, *in litt.*)—Maculae amphigenae, angulosae, saepe irregulares, determinatae, usque 12^{mm}. (et ultra) latae, interdum confluentes, fuscae, Perithecia amphigena, gregaria, plerumque secus nervos disposita, globosa, atra, ca. 100–120 μ diam. Sporidia fere globosa vel ellipsoidea, unicellularia, hyalina, guttulo oleoso magno praedita, 8–9 μ longa, 5–6 μ crassa.

In foliis vivis *Podophylli peltati*, saepe in consortione *Septoriae Podophyllinae*, Peck, in *Bot. Gaz.*, Vol iv., p. 170. Prope Lexington, Ky., leg. Dr. W. A. Kellermann. (No. 13.)

CERCOSPORA SEYMOURIANA, Winter, *nov. spec.*—(Synon. :? *Helminthosporium olivaceum*, B. & R., in *Grevillea*, iii., p. 102.) Cæsrites hypophylli, maculas indeterminatas, vel effusas et totam fere foliorum superficiem obducentes, fuligineas formantes. Hyphæ fasciculatæ, breves, 40–55 μ longæ, torulosæ, parce septatæ, simplices, brunneæ. Sporæ obclavato-filiformes, sursum plerumque longissime attenuatæ, multum denseque septatæ, amœne brunneæ, interdum ad septa constrictæ, usque 100 μ longæ, inferne 7 μ crassæ.

In foliis vivis *Gleditsiæ triacanthi*; Fulton Co., Ill.; leg. A. B. Seymour. (No. 1,780.)

Hottingen bei Zurich, Switzerland.

Cucurbita Californica, Torr.

By C. C. PARRY.

In the BULLETIN for March, 1882, the writer presented a notice of certain diagnostic characters, heretofore overlooked, derived from an examination of mature fruit of three of the peculiar perennial species of *Cucurbita* indigenous to Western North America, with outline sketches of the same. The fourth remaining species, *Cucurbita Californica*, Torr., then imperfectly known, has been lately brought to my notice by Mr. S. B. Parish, of San Bernardino, and, from very complete material kindly furnished by this enterprising collector, I am now able to complete the account, including all the recognized species of Western North America, viz.:

Cucurbita Californica, Torr.—Fruit orbicular-pyriform, 3–3½ inches in diameter, 2½–3½ inches in length, on peduncles 2½ inches long; peduncles curved, thickening upwards, and marked by about ten prominent ridges, which are prolonged in longitudinal lines to the apex of the fruit, other intermediate, less prominent lines intervening on the light green, rugose-hispid surface, irregularly spotted with dark green blotches; external rind thin and flexible, becoming lobulated and deeply wrinkled when dry, and losing its orbicular shape.

Internal cellular tissue fleshy (not fibrous); placentæ in 5 pairs, shortly curved, and bearing medium-sized, light brown seed on the outer edge.

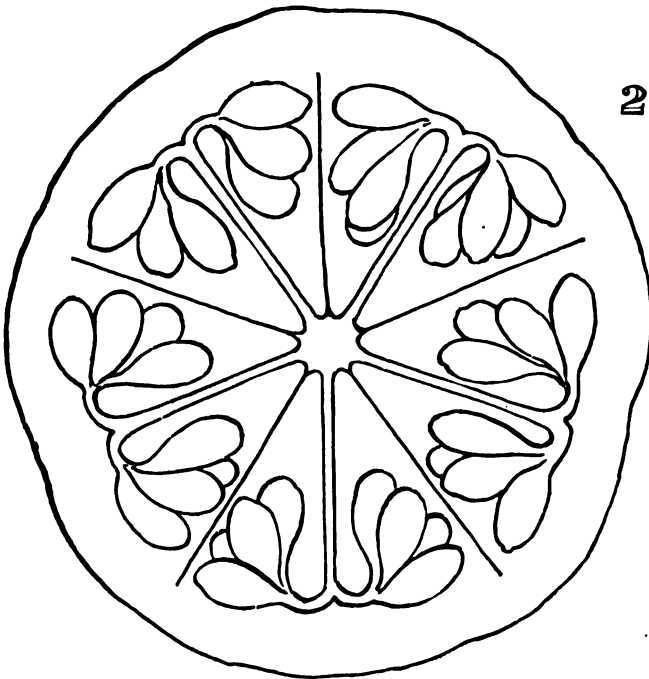
Plant with thick, fleshy, perennial root, annual branches 3–5 feet long, spreading, hispid-scabrous; leaves quinate-lobed, margins more or less undulate, dull green, mottled, with conspicuous branching veins, petioles 1–2½ inches long, blade about the same length, tendrils divided to the base; flowers 2 inches long, similar to those of the other species.

Habitat.—Collected by S. B. Parish, August, 1882, on the foothill slopes of Red-lands adjoining San Bernardino. Readily distinguished from *C. palmata*, growing in the same district, by its smaller size, diminutive foliage, and especially by its dull green, thin-rinded fruit becoming lobulated when dry.

It agrees with the description of *Cucurbita Californica*, Torr., in Botany of California, Vol. i., p. 240, from "imperfect specimens."

DESCRIPTION OF THE FIGURES.—Fig. 1. Medium-sized leaf. Fig. 2. Section of mature fruit. Both natural size.

51



New Species of Grasses.

By GEORGE VASEY.

SPOROBOLUS WOLFII.—This was published and figured in the Botany of Wheeler's Survey, Vol. vi., 1878, as *Vilfa minima*. As *Vilfa* is now united with *Sporobolus*, and as the specific name is pre-occupied, it therefore becomes necessary for our plant to have a new name, as above, in honor of the discoverer, Mr John Wolf. It was collected at Twin Lakes, Colorado, in 1873. It is much more diminutive than *Sporobolus gracillimus*, Thurb., with the spikelets only half as large.

DANTHONIA INTERMEDIA.—Culms 1-1½ ft. high, leafy below, radical leaves 6-10 inches long, narrow, cauline leaves 2 to 6 inches, pubescent, especially on the sheaths, ligule merely a narrow hairy ring, with longer hairs at the margins; panicle narrow, 1-2½ inches long, rays alternate, mostly short, the lower generally with 2 or 3 spikelets, the upper with single spikelets; spikelets 6-8 lines long, about 5-flowered, empty glumes somewhat longer than the flowers, about 5-nerved, acute; flowering-glumes 3-4 lines long, mostly smooth on the back, hairy on the margins, nerves not prominent, teeth about 1 line long, broad, awn stout, about 3 lines long, pale slightly shorter than the flowering glume.

This may be readily distinguished from *D. sericea*, with which it has been confounded, by its shorter and smoother culms and leaves, closer and fewer flowered panicle, flowering-glume smooth or smoothish on the back, by the much shorter and broader teeth, and shorter, stouter awns.

California, Rocky Mountains, Plains of Br. America to Mt. Albert, Lower Canada (O. D. Allen).

New North American Fungi.

By J. B. ELLIS.

Juds
The species of fungi here described were collected by Mr. S. J. Harkness in Utah Territory, mostly at an elevation of 7,600 to 8,000 ft. It should also be stated that the species described on pp. 123-4, Vol. viii. of this journal, were collected at this same altitude.

ALTERNARIA HISPIDULA.—Forming olivaceous tufts shaped like a *Helotium*, with a thick stem composed of closely compacted, branching, minutely roughened threads, expanding at intervals of 15-20 μ into oval-elliptical, 3-4-septate, minutely roughened spores, 12-20 x 8-12 μ .

On sage-brush.

PEZIZA OLEOSA.—Scattered or gregarious, small, subglobose when fresh, orbicular and concave, with a thick, obtuse margin when dry, substance oily-gelatinous, color bright orange-red; asci sessile, sublanceolate, broadest in the middle (75-90 x 10-12 μ); paraphyses none; sporidia biserial, fusiform-navicular, uniseptate, hyaline, 18-22 x 3-3½ μ .

Allied to *P. fusarioides*, Berk. On dead herbaceous stems.

LOPHIOSTOMA PALLIDUM.—Perithecia subhemispherical, 25^{mm} in

diameter, collapsing above; ostiolum only slightly prominent and not strongly compressed; asci sessile, subcylindrical, 90-100 x 12-15 μ ; paraphyses filiform; sporidia more or less biserial, oblong-cylindrical, nearly hyaline, about 7-septate, ends obtuse, slightly curved and one end broader, 18-24 x 5-6 $\frac{1}{2}$ μ .

On weather-beaten wood of service-tree.

SPHÆRIA (MELANOMMA) SULCATA.—Superficial, densely gregarious, perithecia ovate (.33^{mm}), black, not polished; ostiolum tuberculiform, large, with a rather large and nearly circular opening; asci clavate-cylindrical, 130 x 22 μ ; paraphyses abundant; sporidia biserial, broad navicular-fusiform, septate, straw-yellow, becoming brown, 35-45 x 11-15 μ .

On dead sage-brush.

CUCURBITARIA UMBILICATA.—Scattered, depressed-hemispheric, black, rough (.33-.5^{mm}), collapsing above when dry; asci cylindrical, 114 x 11 μ ; sporidia mostly uniserial, elliptical, constricted in the middle, 3-septate and straw-colored at first, becoming muriform and brown, 22-28 x 9 $\frac{1}{2}$ -13 μ .

On decorticated sage-brush.

LEPTOSPHÆRIA OLIVACEA.—Perithecia submembranaceous, about .25^{mm} in diameter, buried in the substance of the stem and covered by the cuticle, which is slightly elevated, stained olive-brown and pierced by the broad, rough, obtuse ostiolum; asci clavate, 75-85 x 15-18 μ ; sporidia fasciculate yellow-brown, vermiform, 6-7-septate, and, when mature, slightly constricted at the septa, third joint from the tip slightly swollen, 75 x 3 $\frac{1}{2}$ -4 μ .

The spore is generally slightly bent just below the last-named joint. On dead herbaceous stems.

PLEOSPORA AUREA.—Perithecia gregarious, subcuticular (.25-.33^{mm} in diameter), soon collapsing, of coarse cellular structure and surrounded at the base with a coarse, fringe-like mycelium of brown, septate, sparingly branched, creeping hyphæ, which are plainly visible through the transparent cuticle; asci broad, obtuse, sessile, about 114 x 3 μ (spore-bearing part); sporidia biserial, elliptical, flattened, 4-septate, with all but the terminal cells divided by a longitudinal septum, golden-yellow, 27-30 x 11-15 μ .

On dead herbaceous stems.

PLEOSPORA PLANISPORA.—Perithecia gregarious, collapsing when dry (.25-.33^{mm}), covered by the scarcely discolored epidermis; asci 114-120 x 25-28 μ ; sporidia biserial, oblong-elliptical, flattened, 5-septate, with a longitudinal septum on each side running through all but the terminal cells, yellow, becoming brown, 30-40 x 15-20 x 11 μ ; paraphyses abundant.

On dead culms of some grass, apparently a species of *Elymus*; mostly on the sheaths.

This is closely allied to the preceding species, but the mycelium is less abundant, the sporidia larger and quite constantly 5-septate.

PLEOSPORA BACCATA.—Perithecia subcuticular, hemispheric, collapsing, rough (.33-.5^{mm}), fringed around the base with abundant, brown, creeping hyphæ; ostiolum papilliform; asci oblong-cylindrical, 114 x 23 μ ; sporidia biserial, oblong-elliptical, 3-septate, with a

partial longitudinal septum. The spore is often composed of only six divisions or cells, loosely attached to each other, the four middle ones placed in a subquadrate manner, with a single nearly globose cell at each end. These different cells are so slightly attached to each other that they easily separate and the sporidium breaks up like a crumbling raspberry.

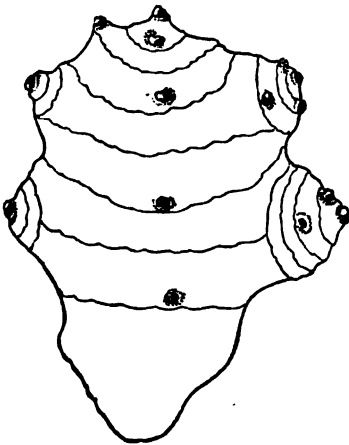
On the dead stems of some species of *Cirsium*.

SPHÆRIA (ANTHOSTOMELLA) PHOLIDIGENA.—Perithecia subcuticular, erumpent, hemispheric, rough ($.33\text{--}.5^{\text{mm}}$); ostiolum slightly prominent, with a rather large aperture; asci linear, $114 \times 7\mu$; paraphyses abundant; sporidia uniseriate, narrow, elliptical, continuously brown, $7\text{--}10 \times 5\text{--}6\mu$. Some of the perithecia contain stylospores, which are much like the ascospores, but a little shorter. This differs from *Amphisphaeria conorum*, Fckl., only in its smaller sporidia and differently shaped stylospores, and may, perhaps, be more properly considered as a mere variety of that species.

On cones of red pine. On the back of the scales and mostly covered by the overlapping point of the next scale below.

Morphology in the Tuber of Jerusalem Artichoke.—Picking up, in my garden, a tuber of Jerusalem artichoke which had been thrown out on the surface by recent spading, I was attracted by the prominence of the buds, and the distinct markings on the tuber, showing the position of the buds, leaves and branches in the order of their phyllotaxis. The accompanying sketch, which I made at the time, will exhibit this arrangement.

On the growing stem, the artichoke (*Helianthus tuberosus*) has the leaves opposite during the early part of its growth, the upper leaves gradually becoming alternate. In this tuber, or underground stem, the opposite-leaved arrangement is plainly visible. On the right side are two arrested branches from the axils of suppressed leaves, corresponding to two others on the left side which are not so fully developed. The alternate buds, occupying the front face (and to which there are others corresponding on the opposite face) seem not to have developed into branches, but remain only as buds. The wavy lines of exfoliating membrane or skin seem morphologically to belong to the leaf-system, and mark the division of the nodes, corresponding in this with the ridge formed by the expansion and adnation of the bases of the opposite leaves as seen in the stem above ground. The internodal spaces are very much contracted, and their wavy, undulating course is due to



NOTE.—*Valsa didymospora*, described on p. 98, Vol. ix., of the BULLETIN, proves to be only an imperfectly developed state of *Valsa subcuticularis*, C. & E.

the irregular cell-growth in the different portions of the tuber. I have not been able to trace the leaf-arrangement from positions of the buds, either in the Irish or sweet potato (both underground stems) so well marked, as in this of the artichoke, probably due to greater irregularity in cell-growth of these tubers. This of the artichoke offers a fine illustration of the underground tuber following the character of the growth above ground.

Aiken, S. C.

H. W. RAVENEL.

Notes on New England Marine Algæ. II.—*Calothrix parasitica*, *Jndv.*
Thuret.—This species, previously reported at Wood's Hall, Mass., was very abundant last September at Cottage City, completely covering the *Nemalion multifidum* growing at low water-mark between the Oak Bluffs and the Camp Meeting landings. The natural color of the *Nemalion* was entirely lost, giving place to a very dark bronze-green, turning almost black in drying. This species also occurs at Marblehead, but quite sparingly; the plants are so scattered through the *Nemalion* as to be observable only under the microscope, not with the naked eye. I have also found what appears to be the same species growing on plants of *Batrachospermum vagum*, collected in fresh water at Billerica, Mass., by Mr. Edwin Faxon.

Codiolum longipes, Foslîe.—In July, 1881, I found at Peak's Island, Portland Harbor, Maine, a form of *Codiolum*, differing considerably from the typical *C. gregarium*, A. Br., the only species recorded in America. The unicellular fronds in the Portland plant are longer and slenderer, the stipe longer in proportion to the "clava." Dr. F. R. Kjellman, of Upsala, Sweden, kindly examined a specimen, and reported it identical with *C. longipes*, a species founded on a plant recently discovered in Norway, and described and figured in Christiania Videnskabs-Selskabs Forhandlinger, 1881, No. 14. Several species of *Codiolum* have been described, but, as the development is little known, some of them may be merely stages of growth of others. My specimens appeared to be entirely in a vegetative condition, showing no indication of the formation of spores. The plant grew on boulders at about half tide, and was not mixed with any other alga. *Ulothrix isogona* grew in the vicinity; but in distinct patches, and generally not on the same rock. When wet, the two were hardly distinguishable by the naked eye, but, when dry, the *Codiolum* showed a curious mottled appearance, the tufts falling apart so that the transparent stipes showed in minute white dots among the green of the upper parts of the cells.

Chorda tomentosa, Aresch.—Though not recorded, this species has probably been collected in this country, but confounded with *C. filum*, the spring state of which it considerably resembles. It is, however, shorter and stouter, and has longer and denser hairs, which continue till after the fruit is formed, in May and June. The hairs of *C. filum* fall off in the spring, while the fruit is not formed until August. The sporangia of *C. tomentosa* are about double the length of those of *C. filum*, and are cylindrical rather than ovate. The former are figured in Areschoug's *Observationes Phycologicæ*, Part iii., Tab. ii., Fig. 1; the latter in Farlow's *Manual of the New Eng-*

land Marine Algæ, Pl. vi., Fig. 1. My specimens were collected in June, at Nahant, Mass., where the plant seems not to be very rare.

Ralfsia deusta, Ag., reported in America only from Eastport, Maine, I found at Marblehead, Mass., near the Clifton House. It grew just at and a little below low water-mark, in company with *Corallina* and *Lithothamnion*. The growing plant is rather handsome, and quite distinct from other species of the genus, but in drying it loses much of its character.

Ralfsia verrucosa, Aresch., I found at East Chop, Martha's Vineyard, last September; and also

Petrocelis cruenta, Ag. Neither species has been reported as found south of Cape Cod. I found them after a severe gale, which had washed up large quantities of algæ. These two species were on pebbles on which *Phyllophora Brodiai* was growing, and had apparently come from deeper water. Both were without fruit, and were smaller than the common northern forms.

Callithamnion membranaceum, Magnus.—This curious species, which is quite common in Massachusetts Bay, is much the smallest of the genus, and its habitat is a very unusual one for one of the Floridæ. It grows in the interior of polyzoa, sponges, and sometimes of siphonaceous algæ. In spring and summer, Laminarias and Agarums will not uncommonly be found covered with a *Sertularia*, which, instead of being white or yellowish, is bright red, being filled with a dense mass of *Callithamnion*. This species was discovered in 1872 in the German Ocean, by Dr. P. Magnus, and described and figured by him in *Die Botanischen Ergebnisse der Nordseefahrt*, Berlin, 1874. What is probably the same plant was found on the Massachusetts coast by Dr. P. F. Reinsch, and described and figured in the *Botanische Zeitung* for Jan. 10, 1879, but no name was given to it. The position of the tetraspores in Reinsch's figure differs somewhat from that in Magnus's. All the fertile specimens I have found agree with the latter, and a specimen which I sent to Dr. Magnus is pronounced by him perfectly identical with the European plant. It is reported by Hauck as found in the Adriatic, and is probably quite generally distributed, but has escaped notice from its minuteness and place of growth.

Malden, Mass.

FRANK S. COLLINS.

***Thalictrum anemonoides* or *Anemone thalictroides*, which?—**

Dr. Gray, in his Manual, has placed the rue-anemone in the genus *Thalictrum*, and he has been generally followed in this country. Wood, however, places it, in his Botanist and Florist, in *Anemone*, and he is, I think, correct in doing so. It differs essentially from *Thalictrum* in having an involucre, and agrees in all respects with *Anemone* except that Dr. Gray makes the arbitrary distinction "achenia * * * not ribbed." Omit the *not*, and let it read "achenia pointed or tailed, flattened or ribbed," and the generic description of *Anemone* of Dr. Gray will fit admirably the rue-anemone. It resembles in a striking manner the *Anemone nemorosa*, and is certainly more nearly related in every respect than *Anemone Hepatica* is. Since making my note to this effect, I find that Bentham

and Hooker have placed *Syndesmon*, Hoffm., under *Anemone*, though Dr. Gray considered it a subgenus under *Thalictrum*. Taking all circumstances into account, it would seem a wise policy to go back to the old Linnean name of *Anemone thalictroides* and settle our rue anemone in the place where it can find its closest connections.

Cincinnati, Ohio.

JOS. F. JAMES.

Abnormal Trillium.—A specimen of *Trillium sessile* was lately brought to me which was quite interesting because of its departure from the normal type. Instead of having the parts all in threes, they were mostly in fives. There were five leaves, five sepals, five petals, eight stamens, four stigmas and a four-celled ovary. One of the petals had partly developed an anther on one side. The plant is very common here, but I have never seen a specimen like this before.

Cincinnati, Ohio.

JOS. F. JAMES.

Violet with Runners.—Does any one know whether it is common to find *Viola striata* producing long runners? I have found, in a locality near here, many specimens which have runners from 12 to 18 inches long, and I should like to know whether this is a common thing with white violets.

Cincinnati, Ohio.

JOS. F. JAMES.

Alfred Robson Young died in Brooklyn, N. Y., April 12th, 1883, aged 54 years.

Mr. Young was born in York, England, January 14th, 1829, received his early education in Scarborough, and, at the age of fourteen, came to this country with his uncle, Mr. John Johnson, of Brooklyn. For more than forty years he was a collector and student of marine algæ, and made large collections in Europe, America and Australia, having resided in the latter country for a considerable time some thirty years ago.

Perhaps no man of the present generation was so intimately acquainted with the marine flora of New York Bay and adjacent waters as Mr. Young. An acute and accomplished botanist in this department, he was a gentleman of many graces and virtues of mind and character, and will be long and pleasantly remembered by all who shared his friendship. Though suffering from painful diseases, through many months and years, and which first deprived him of sight and at last of life itself, he was remarkably cheerful to the end, and never ceased to take a lively interest in his favorite plants.

Taunton, Mass.

A. B. HERVEY.

Carices Wanted.—Mr. Sereno Watson writes us that Dr. H. Christ, Rue de l'Arbre, 5, Basel, Switzerland, is engaged upon a revision of the European *Carices*, and desires to procure, by exchange or purchase, American specimens for comparison.

Austin's Musci Exsiccati.—Mrs. C. F. Austin, of Closter, N. J., writes us that she still has remaining two sets of the *Musci Appallachiani* and five of the *Supplement*, which she will dispose of at a low price to any one who desires to purchase them.

Plants Growing in Trees.—A long list might be made of the plants that domesticate themselves in trees. The elms of New Haven, Connecticut, furnish some interesting examples: currant bushes bearing fruit occur in many places, as on Hillhouse Avenue and the College grounds. A matrimony-vine (*Lycium vulgare*), flourishes in one of the huge trees in front of the Scientific School. I have seen gooseberry bushes in similar situations. Grass often figures as an air-plant, and a hollow in a trunk, some fifteen feet from the ground, is filled with a beautiful growth of ferns. I refrain from giving the specific locality for fear the progressive aldermen may cut the tree down.

Brick Church, N. J.

HENRY BALDWIN.

Botanical Notes.

The Distribution of Ferns in the United States. In a paper upon this subject in the *Proceedings* of the American Philosophical Society (Feb. 2, 1883, p. 610), Mr. George E. Davenport says:

So far as now known, New York, Michigan, Florida, Vermont and California, in the order named, have the greatest number of species of ferns within their respective limits.

In the first, second and fourth of these States, the number has, in all probability, reached, or very nearly reached, its maximum, while in the third and fifth it is likely to be largely increased, and those States, from their favorable situations, climate, and comparatively extensive, unexplored territory, will undoubtedly lead all other States in the future, Arizona and Texas alone being at all likely to compete with them for the highest place.

If, however, we distribute our ferns according to the number of square miles of territory which each of the five first-named States contains, then Vermont will lead the others, her ratio being as 1 to every 226 $\frac{3}{4}$ square miles, that for New York as 1 to 814, Michigan 1 to 1,191 $\frac{1}{2}$, Florida, 1 to 1,289, and California 1 to 4,295 $\frac{1}{4}$ square miles of territory.

Taking the extremes of the territorial limits, excluding the District of Columbia, which has 1 species to each 2 $\frac{1}{2}$ miles of territory, Rhode Island gives us 1 species for each 38 $\frac{1}{2}$, and Delaware 1 to 75, as compared with Pennsylvania's 1 to 109 $\frac{1}{4}$, Colorado's 1 to 4,200 and Texas's 1 to 7,878 $\frac{3}{8}$, square miles.

If we take an average of the fern-flora for the different geographical sections of the United States, on the basis of the present list, New England gives us an average of 40 species for each State, the Middle Atlantic States 40, the South Atlantic 27, the Gulf States 27, the Central States 25, the Pacific States 23, and the Territories an average of 19.

The returns from most of the Territories are altogether too meagre at present to permit of any comparisons, and those already made will necessarily undergo considerable modification as the gaps in the lists for other States fill up.

But, while no absolutely reliable comparisons can be made, nor the precise limits of each species be determined from the present incomplete tables, we may ascertain from them with a tolerable degree of

certainly the range of certain species, and find material for some interesting observations.

Thus, we find the cosmopolitan *Asplenium trichomanes* and *Pteris aquilina* in thirty-five and thirty-nine out of the forty-eight States and Territories respectively, while their actual presence in a greater number may be safely assumed. *Polypodium vulgare* appears in thirty-three, with the same, or an even greater probability of its occurring in others in its favor, while its near congeners, *P. Californicum*, and *P. falcatum*, as well as *P. Scouleri*, are restricted to two or three States. Of the remaining Polypodiums, all but *incanum*, which appears in twelve States, are restricted to the single State of Florida, which furthermore monopolizes all the species we have in six genera, the tropical character of these being at once indicated by this fact.

The only other State (since the discovery of *Scolopendrium* in Tennessee has divided with New York the honor of that fern's presence) which may now claim a monopoly of a genus is New Jersey, the very local *Schizaea* being restricted to a portion of its limits, and again restricted to a single species.

Adiantum pedatum occurs in thirty-five States or Territories, while its congener, *A. Capillus-Veneris*, is restricted to thirteen, and the tropical *A. tenerum* to a single State.

The Osmundas are represented by one or more species in twenty-nine, *Onoclea* in twenty-eight States or Territories, and these probably occur in more, although not reported west of the Rocky Mountains. *O. sensibilis* extends as far west as Dakota and Montana, and, in the last-mentioned Territory, is said to have been discovered in a fossil state.

Cystopteris fragilis extends from Maine to California, through thirty-three States and Territories, apparently avoiding the South Atlantic and Gulf States, with the exception of North Carolina, while *C. bulbifera* occurs in twenty-five, covering a more unequal, but broader range south and west, the limits of which terminate in Louisiana and Dakota. *C. montana*, so recently discovered in Colorado by Brandegee, is reported elsewhere in the United States only from Alaska. The Aspidia are represented in forty-four, the Asplenias and Bortrychia in forty-one States or Territories each, while the drought-resisting Gymnogrammes, Notholænas, Cheilanthes and Pellæas are almost wholly restricted to the arid regions west of the Rocky Mountains, a few scattering species only coming east, north, or south.

It is interesting to note the changes which have taken place in the number and distribution of our ferns since Redfield published his valuable paper on the "Geographical Distribution of the Ferns of North America," in the TORREY CLUB BULLETIN for January, 1875, and Mr. Watt his admirable review of Mrs. Lyell's Hand-Book in the *Canadian Naturalist* for 1870. Mr. Redfield enumerated 125 species, which have been increased up to the present time to 153 or 156, according as we may consider the claims of certain ferns to specific rank, or their right to a place in our fern-flora, while the range of the older species has been more or less extended.

Taking the number in the list accompanying this paper for a base, viz., 155, we have since 1875 an increase of 30 species.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College, Tuesday evening, February 13th—the President in the chair and forty-two persons present.

The following Committees were appointed for the present year :

Finance Committee.—Addison Brown, John L. Wall and Lawrence Johnson.

Committee on Admission of Members.—W. R. Gerard and Benjamin Braman.

Herbarium and Library Committee.—N. L. Britton, Elizabeth G. Knight, Arthur Hollick and P. V. Le Roy.

Miss Knight exhibited specimens of *Limnanthemum lacunosum*, Griseb., having large, pellucid, submerged leaves.

A communication was read from Dr. R. J. Southworth, of Yonkers, in which the writer offered his herbarium to the Club. On motion, the gift was accepted, and the Secretary instructed to return the Club's thanks therefor.

Dr. J. S. Newberry delivered an interesting and instructive address upon the "Botany of the Arid Regions of Northern Mexico and Southern United States," which was illustrated by lantern slide views of the localities and objects mentioned in the course of his remarks.

At the regular meeting of the Club on Tuesday evening, March 13th, the chair, in the absence of the presiding officers, was occupied by Mr. Braman. There were thirty persons present.

Dr. Kunzé showed a specimen of *Casteria pulchra*, exhibiting an abnormal mode of growth; *Mamillaria stellaris*, in flower and fruit; and fruit of *Cereus serpentinus*, a cactus which is not known to have hitherto perfected its fruit in the United States. The flower was fertilized with pollen a year old taken from *Cereus Macdonaldia*. Dr. Kunzé stated that some of these night-blooming *Cerei* sometimes flower in the day-time, an occurrence probably due to a fall in the temperature.

Mr. Chamberlain read a paper on the algæ of New York Harbor and vicinity, illustrating it with a collection of mounted specimens.

Mr. Schrenk, referring to a note on tuckahoe in the BULLETIN for October, 1882, remarked that he had, contrary to a statement made therein, discovered cellular structure in the object, and exhibited mounted sections under the microscope which plainly showed this.

Mr. Britton, referring to an article in the BULLETIN for May, 1873, on the movement of pollen-grains in the calla, exhibited mounted specimens of the pollen under the microscope.

Four persons were elected active members, one person was elected a corresponding member, and four names were proposed for membership.

The Syracuse Botanical Club.—At the Annual Meeting of the Syracuse Botanical Club, March 19th, the following officers were elected for the ensuing year:

President, Mrs. Lillie Barnes; Vice-President, Mrs. Nellie Goodrich; Recording Secretary, Miss Mary Hotchkiss; Corresponding Secretary, Mrs. H. S. Gifford; Treasurer, Miss Hattie Leach.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.]

New York, June, 1883.

[No. 6.]

A New Fern.

By GEORGE E. DAVENPORT.

(Plate XXXIV.)

CHEILANTHES PRINGLEI, *n. sp.*—Rootstock slender, creeping, clothed with linear-lanceolate, acuminate brown scales with darker midnerves; stipites $1\frac{1}{2}'$ to $4\frac{1}{2}'$ long, reddish or chestnut-brown, furrowed along the face, clothed at the base with scales similar to those on the rhizoma, but lighter, less acuminate and oftener without midnerve, above sparingly with paler deciduous scales and chaff; laminae $1'$ to $2\frac{1}{2}'$ long, nearly as broad, triangular or irregularly deltoid or ovate-deltoid, bi- to tripinnately divided into 5 to 7 pairs of opposite and spreading—in the smaller and sterile fronds—or, in the larger and fertile ones, alternate erecto patent pinnæ, lowest pair distant, sometimes shorter than the next, apex deeply pinnatifid, obtuse, both surfaces naked, dark green, rachises beneath clothed with light, nearly transparent—whitish brown becoming darker with age—ovate or linear-lanceolate scales with entire or sparingly toothed margins, those of the main rachis the narrowest; pinnæ $\frac{3}{8}'$ to $1\frac{1}{8}'$ long, lower unequally deltoid or ovate, obtuse, bipinnate, obliquely and pinnatifidly cleft toward the apex, uppermost oblong, pinnate or deeply pinnatifid; pinnules $\frac{1}{8}'$ to $\frac{3}{8}'$ long, the lower series usually the longest, ovate or oblong, obtuse, pinnately divided, or deeply cleft into cuneate-ovate or obovate, oblique segments which are again deeply cleft into cuneate, strap-shaped divisions, those of the largest segments again deeply cut into narrow, obtuse or blunt, cuneate lobes, the recurved tips in the fertile fronds forming distinct herbaceous involucre with entire or slightly crenulate margins; sori one to each ultimate lobe on the apex of a free veinlet; sporangia few, light brown, with about 18 rings. Spores light colored.

Habitat. Base of rocks, mountains of South-eastern Arizona. Collected by Mr. C. G. Pringle, May 2d, 1883.

I take pleasure in dedicating this beautiful fern to my friend Pringle, to whom I am under many obligations. Its delicately cut fronds, exquisite grace and loveliness suggest to my mind something of the refined tone and delicacy of its discoverer's own nature, and this dedication therefore seems to me doubly appropriate. The species is one of the most distinct and satisfactory that has been discovered for a long time, and is wholly unlike any known to our flora or heretofore described. The true form of the frond appears to be triangular, or at least the tendency is toward that form, although in some fronds the greatest breadth is across the second pair of pinnæ, as seen in those drawn by the artist, and, while the lower series of

pinnules are generally the longest, sometimes the upper series vary alternately with one or two as long as or longer than the lower, making an irregular outline. The shape of the segments and ultimate divisions varies considerably, but, in holding a fertile frond to the light, the general appearance is that of being finely cut into numerous ligulate divisions with cuneate bases. The young fronds before being unrolled (crosiers) are completely enveloped in a dense covering of whitish scales. The dimensions given for this species will no doubt be found to vary as more of it is collected. My thanks are due to Mr. Faxon for the pains he has taken with the drawing. The excellence and accuracy of his work is now too well known to need any special commendation, and the present drawing speaks for itself.

By a happy coincidence I am able to announce a double discovery by Mr. Pringle, and to accompany my description of his charming fern with a description by Mr. Peck of a new species of fungus found growing on the epidermis of the lamina in the form of pretty orange-colored dots, which, under the glass, resemble little cups filled with bright yellow spores. Mr. Peck has very kindly sent me his manuscript description, and expressed a wish to have it accompany my own description of the fern upon which the fungus grew, and it is accordingly given hereafter.

EXPLANATION OF PLATE XXXIV.—1. Plant, natural size. 2. Enlarged pinnule (second lower pinnule on second pinna). 3. Segment enlarged. 4. Lobe with one indusium turned back. 5. Scale from back of frond. 6. Scale from rhizoma. 7. Sporangium. 8. Spore.

A New Fern Rust.

Index,

By CHAS. H. PECK.

CÆOMA CHEILANTHIS, *n. sp.*—Spots indefinite, pallid or pale yellow; sori minute, rotund, slightly prominent, hypophyllous or occasionally amphigenous; spores globose or broadly obovate, regular, bright luteous or orange-colored, .00065 to .0009 of an inch long.

Living fronds of *Cheilanthes Pringlei*, Davenport, Arizona. May. Collected by C. G. Pringle; communicated by G. E. Davenport.

This fungus, though closely resembling *Cæoma filicum* Lk., (*Uredo filicum*, auct.), in external appearance, is readily distinguished from that species by its smaller, more regular and mostly globose spores. In *C. filicum* the spores are more or less angular and .0008 to .0011 of an inch long. In *C. Aspidiotus* (*Uredo Aspidiotus*, olim) which is regarded by some mycologists as a form of *C. filicum*, not only is the external habit different from that of both the preceding species, but also the prevailing form of the spores is more elongated and their length ranges from .0012 to .0017 of an inch.

Arceuthobium in New Hampshire.—I recently found near this place, in a swamp, on spruce trees, *Arceuthobium pusillum*, Peck (*A. minutum*, Engl.). The plants were in fruit (last season's plants), and the trees to which they were attached were in a dying condition. I have looked for *Arceuthobium* here before, but must have overlooked it, or it may be that it is of recent introduction here, which I doubt.

Hanover, N. H.

HENRY G. JESUP.

A List of Grasses from Washington Territory.

By F. LAMSON SCRIBNER.

(By the wise liberality of Mr. Villard and his associates, who now control the Northern Pacific Railroad system, a very extended and complete economic survey of the territory tributary to these enterprises has for the past two years been prosecuted under the able direction of Professor Raphael Pumpelly. A year since a Division of Forage Plants and Statistics was organized, and Mr. T. S. Brandegee, who has for years done excellent botanical service, was appointed as observer and collector with the party operating in the Yakima River region and the adjacent parts of the Cascade Mountains in Washington Territory. Mr. Frank Tweedy was also with the party as topographer, and found time to make a fine collection of excellent specimens. The grasses obtained by these gentlemen have been critically studied by Mr. Scribner, and the result as given below shows the excellent outcome of their united labors.—W. M. CANBY.)

Paspalum distichum, Lin.

Beckmannia eruceformis, Host.

Panicum capillare, Lin.

Panicum Crus-galli, Lin.

Panicum scoparium, Lam. Thurber, in Bot. Cal. ii., p. 259.

Spartina gracilis, Trin.

Alopecurus aristulatus, Michx.

Hierochloa borealis, R. & S.

Stipa comata, Trin. & Rupr.

Stipa viridula, Trin. Montana; Wm. M. Canby.

Oryzopsis cuspidata, Benth. (*Eriocoma*, Nutt.)

Phleum alpinum, Lin.

Sporobolus asperifolius, Thurber. Montana; Wm. M. Canby.

Sporobolus cryptandrus, Gray.

Sporobolus cuspidatus (*Vilfa*, Torr.) Montana; Wm. M. Canby.

Sporobolus depauperatus (*Vilfa*, Torr.)

Agrostis alba, L.? There is no *palea* manifest, but the general characters of the plant point rather to *A. alba* than to *A. elata*.

Agrostis tenuifolia, Bieb., Trin. Icon., 3. t. 65. This appears like a slender, narrow-leaved, awnless form of *Agrostis exarata*, and has been so referred (No. 1,127, Kellogg & Hartford). It seems to be a well marked species, however, and so well accords with Trinius's figure of *A. tenuifolia* that I have little hesitation in referring it to that species. As I understand *A. exarata*, I am not prepared to unite this species with it.

Agrostis geminata, Trin., Uniflor. 207; Icon. 3. t. 28. A very delicate and pretty alpine species about a foot in height, the hair-like, spreading branches of the panicle few-flowered at the ends, and the flowering-glume slender awned.

Agrostis varians, Trin.

Agrostis foliosa, Vasey, ined. Equals Nos. 1 and 47 of Howell's Oregon coll.

Agrostis exarata, Trin. The same form as represented by No. 619 E. of Hall's Oregon collection. There is also a larger, more densely flowered and awned form, with strongly scabrous leaves.

Polypogon Monspeliensis, Desf.

Cinna latifolia, Griseb. (*C. arundinacea*, var. *pendula*, Gray.) A large form, with the rather small spikelets crowded at the ends of the branches, and having a rudiment a fourth of a line long.

Deyeuxia aequivalvis, Benth. (*Agrostis*, Trin.)

Deyeuxia Canadensis (*Calamagrostis*, Beauv.)

Deyeuxia Langsdorffii, Kth. (*Calamagrostis*, Trin.)

Deyeuxia neglecta, Kth. (*Calamagrostis*, Gærtn.; *C. stricta*, Trin.)

DEYEUXIA TWEEDYI, *n. sp.* Culms stout, 2—4 ft. high, smooth; leaves flat, $\frac{1}{4}$ an inch wide or less, 2—4 in. long, with acute, rigid tips, minutely scabrous above, smooth beneath; ligule elongated, lacerated; panicle narrow, dense, 3—4 in. long, often interrupted below; spikelets crowded on the short (1 in. or less), more or less spreading, very compound branches; outer glumes 2 $\frac{1}{2}$ —3 lin. long, lanceolate, acute or sub-acuminate, membranous and finely scabrous on the back, the upper 3-nerved below; flowering-glume a little shorter than the outer ones, of similar texture, and, like them, minutely scabrous (becoming firmer and sub-rugose in fruit), 5-nerved, two-cleft at the tip, with the lateral nerves sometimes projecting into four unequal teeth; awn stout, attached a little below the middle of the glume, about 3 lines long, twisted below, bent near the middle, and projecting beyond the glumes; palea broad and equalling its glume; hairs few, those at the side, which are longest, scarcely $\frac{1}{2}$ line long; rudiment, with its hairs, about one-half the length of the floret; anthers large, 1 $\frac{1}{2}$ line long.



(Fig. 1. Outer glumes. Fig. 2. Floret, with rudiment. Fig. 3. A stamen. All enlarged.)

Cascade Mountains, Washington Territory. Collected by Mr. Frank Tweedy of the Corps of Topographical Engineers in the service of the Transcontinental Survey. Mr. Tweedy has been a careful and zealous collector of the plants of the various sections of our country which he has visited, and it is with pleasure that I dedicate this species to him.

Deschampsia elongata, Munro. (*Aira*, Hook.)

Deschampsia calycina, Presl. (*Aira danthonioides*, Trin.)

Deschampsia cespitosa, Beauv. (*Aira*, Lin.)

Deschampsia latifolia (*Aira*, Hook.)

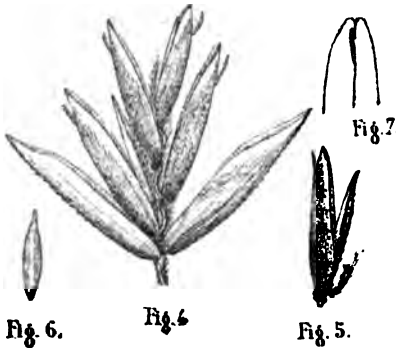
Trisetum cernuum, Trin.

Trisetum canescens, Buckley. A slender, few-flowered form.

Trisetum subspicatum, var. *molle*, Gray.

Trisetum Wolfii, Vasey. (*T. subspicatum*, var. *muticum*, Bolander.)

TRISETUM BRANDEGEI, *n. sp.* Culms rather stout, erect or geniculate at the base, 1—2 ft. high, smooth, leafy; sheaths loose, longer than their internodes, smooth below, scabrous near the throat; leaves flat, about 6 inches long (the upper one 3—4 inches long and from 3—4 lines wide), scabrous on both sides with a few scattered hairs;



outer glumes broadly lanceolate, nearly equal in length, the lower frequently, the upper always, 3-nerved, scabrous on the keel from near the middle; flowering-glume $2\frac{1}{2}$ lin. long, surrounded by a tuft of short hairs, minutely rough-tuberculate and rounded on the back, firm in texture, indistinctly 5-nerved, bearing just below the scarious and obtusely 2-lobed apex a short, scabrous and straight awn equalling or shorter than the lobes; grain smooth, linear, a line long.

(Fig. 4. Spikelet. Fig. 5. Floret, with portion of rachis. Fig. 6. Grain. Fig. 7. Apex of flowering-glume.)

Cascade Mountains, T. S. Brandegee and Frank Tweedy, August, 1882.

Allied to *Trisetum Wolfii*, Vasey, (*T. subspicatum*, var. *muticum*, Bolander), but much more robust in habit, outer glumes more nearly equal in size, flowering-glume less flattened, of firmer texture, rougher and constantly awned.

Danthonia Californica, Bolander.

Danthonia Californica, var. *unispicata*, Thurber.

Danthonia intermedia, Vasey. (*D. sericea*, Thurber, in Bot. Cal., Vol. ii., p. 294.)

Bouteloua oligostachya, Torr. Montana; Wm. M. Canby.

Phragmites communis, Trin.

Munroa squarrosa, Torr. Montana; Wm. M. Canby.

Kaleria cristata, Pers. Both the smooth and pubescent forms.

Eatonia obtusata, Gray.

Melica bulbosa, Geyer.

Melica fugax, Bolander (?)

Melica Hallii, Vasey (teste Vasey.)

Pleuropogon refracta, Benth. (*Lophochlaena*, Gray.)

Distichlis maritima, Raf. (*Bryzopyrum spicatum*, Hook & Arn.)

Poa purpurascens, Vasey, in Bot. Gazette, 1881-82, p. 297. Probably only a form or variety of *P. alpina*, L., and now so considered by Dr. Vasey himself.

Poa pulchella, Vasey. (A large form of the species, *vide* Vasey.) A slender grass, scarcely a foot in height, with narrow leaves and an open, rather few-flowered panicle. Spikelets 3-4 lines long, 3-4-flowered, outer glumes ovate, obtuse, the upper 2 lines, a little longer

than the lower and distinctly 3-nerved below; first flowering-glume 2 lines long, hairy near the base, scabrous above and scarious margined near the obtuse summit.

Poa casia, Sm., var. *strictior*, Gray.

Poa Nevadensis, Vasey, ined. (*P. tenuifolia*, var. *scabra*, Vasey, in herb.) Equals No. 474 of E. Palmer's collection of 1877.

Culms 2 feet or more high, scabrous below the panicle; sheaths and leaves scabrous, very narrow, and carinately folded when dry, those of the radical tuft 6—12 inches long, the upper leaf 1—3 inches long, ligule about 2 lines long, scabrous; panicle narrow, rather densely flowered, about 6 inches long, branches 2 or more at each joint, the lower about 2 inches long, the longer ones branched and flower-bearing above, naked below; spikelets 3—5 lines long, 3—8-flowered; glumes scabrous, the outer ones $1\frac{1}{2}$ —2 lines long, nearly equal or the lower a little shorter, obtuse or subacute, 3-nerved; first flowering-glume 2 lines long, a line broad, obtuse, nerves obscure, scarious margined above, and with a few very short hairs at the base; palea ciliate on the keels and scabrous between them.

The characters of this grass agree in many points with those of *Atropis scabrella*, Thurber, in Bot. Cal. ii., p. 310, but whether it be the same I am unable to say, having never seen any authentic specimens of that species.

A propos of Cicero Swamp.—By my last BULLETIN I learn that the Rev. Mr. Wibbe thinks poorly of this swamp. We of the Syracuse Botanical Club entertain different sentiments regarding it.

During the past two years we have visited it six times—once in May, twice in June, once in July, once in August, and once in September. We have encountered only one rattlesnake, and he gave us long and timely warning of his presence, so that several of us felt safe in watching him coil twice, in counting five of his rattles, and in listening till he began his third rattle (which, by the way, sounds like a bumble-bee under a glass, and no louder), then we walked away, he making no attempt to pursue us.

From the accounts of the dwellers in that vicinity, these snakes never attack one unless they are injured, and always give three warning rattles.

In our six visits we have seen but one other snake, and this neither troubled us nor we it.

Lodi Swamp, commonly called Tamarack Swamp, has been a rich field for botanists, yet not a very pleasant one for ladies to visit, as it borders on the Erie Canal, and one can never go there without meeting tramps or rough boys, who, to do them credit, have proved, like the rattlesnakes, not at all troublesome to us. But in "Tamarack" we always see many and large snakes. We have collected there, for years, all the plants Mr. Wibbe mentions, excepting, perhaps, *Solidago linoides* and *Viola renifolia*. I can find no description of the latter, so am not sure about it.

Mitella nuda is very common in Onondaga County. We first found it on a rocky hillside near Marcellus Station; since then we have found it in swamps and on hills. It can be collected in the

woods nearly the whole length (some six miles) of the Jamesville road.

In Cicero Swamp we have collected the following plants, which seemed rare to us, not finding most of them elsewhere in the County: *Drosera longifolia*, L., *Pyrus arbutifolia*, L., *Nyssa multiflora*, Wang., *Lonicera oblongifolia*, Muhl. (with pure white flowers), *Viburnum nudum*, L., *Solidago neglecta*, Torrey, *Vaccinium macrocarpon*, Ait., *Chiogenes hispidula*, Torr. and Gr., *Andromeda polifolia*, L., *Kalmia glauca*, Ait., *Lysimachia longifolia*, Pursh, *Menyanthes trifoliata*, L., *Abies nigra*, Poir., *Lemna trisulca*, L., *Scheuchzeria palustris*, L., *Calopogon pulchellus*, R. Br. (with pure white flowers), several other orchids rare here, *Smilacina trifolia*, Desf., *Juncus nodosus*, L., *Eriophorum vaginatum*, L., *E. Virginicum*, L., *E. Polystachyon*, L., and *E. gracile*, Koch (with their varieties), *Rhynchospora alba*, Vahl., *Carex trisperma*, Desv., *C. limosa*, L., *C. irrigua*, Smith, *C. folliculata*, L., *Botrychium simplex*, Hitch., and *Lycopodium inundatum*, L. Then, in the Clay Swamps, which are merely a continuation of Cicero Swamp, containing many more rattlesnakes if the reports we heard of them be true, we gathered *Geranium maculatum*, L. (with pure white flowers), *Trifolium hybridum* (which will probably be common soon), *Mikania scandens*, L., *Dalibarda repens*, L., *Chrysosplenium Americanum*, Schwein., *Epigaea repens*, L., *Ilex monticola*, Gray, *I. verticillata*, Gr., *I. laevigata*, Gr., *Nemopanthes Canadensis*, D. C., *Bartonia tenella*, Muhl., *Pogonia pendula*, Lindl., *Cypripedium arietinum*, R. Br., *C. acaule*, Ait., *Trillium erythrocarpum*, Mich., *Lilium Canadense*, L., and var. *aureum*, *L. superbum*, L., *Ophioglossum vulgatum*, L., *Botrychium ternatum*, varieties.

If the manes of the ancient Romans return to visit the localities in Central New York that have been named for them they must suffer. Still, I think were I even Cicero I could endure to have the most miserable parts of that swamp named for me, could I return to see what we saw there one lovely day in June—a large mat of pale citrine *Sphagnum*, over which swayed a hundred or more maroon flowers of the pitcher-plant, while clustered at their feet were their quaint leaves of a deeper citrine, veined with maroon. If one were fond of fine coloring it was a sight to rejoice in, and one never to be forgotten.

Syracuse, N. Y.

MARY OLIVIA RUST.

Contributions toward a List of the State and Local Floras of the United States.

IV. THE SOUTHERN STATES.

List of foreign Plants introduced into the Gulf States. By Charles Mohr. (B.)

In Bot. Gazette, Vol. iii. Logansport, 1878.

KENTUCKY.

Catalogue of the native phænogamous Plants and the Ferns of Kentucky. By C. W. Short, M.D. (A.)

In Transylv. Journ. Med., Vol. vi. Louisville, 1833.

(Supplementary catalogues by Profs. Short and Peters in the same journal, Vols. vii. and viii. 1834-1836.)

The Ferns of Kentucky. By John Williamson. (D.)
12mo, pp. 154. Louisville, 1878.

List of Timber Trees found along the south-central part of the State,
from Columbus to Pound Gap. By L. H. De Friesse. (A.)
In Geol. Surv. Ky., Part x., Vol. v., 2d ser. Frankfort, 1876.

Jefferson County.

Florula Louisvilleensis. By H. D. McMurtrie, M.D. (A.)

In McMurtrie's History of Louisville, 8vo. Louisville, 1819.

Fayette County.

Florula Lexingtoniensis; or, a descriptive Catalogue of the phænogamous Plants indigenous to this portion of Kentucky. By C. W. Short, M.D. (D.)

In Transylv. Journ. Med., Vols. i. and ii. Lexington, 1828.

Barren and Edmonson Counties.

Report on the Botany of Barren and Edmonson Counties. By John Hussey. (A.)

In Geol. Surv. Ky., Part ii., Vol. i., 2d ser., pp. 32. Frankfort, 1876.

Greenup, Carter, Boyd and Lawrence Counties.

Report on the Forest Timber of Greenup, Carter, Boyd and Lawrence Counties. By N. S. Shaler and A. R. Crandall. (B.)

In Geol. Surv. Ky., Vol. i., new series. Frankfort, 1876.

Grayson, Breckenridge, Ohio and Hancock Counties.

Report on the Timber Trees of Grayson, Breckenridge, Ohio and Hancock Counties. By L. H. De Friesse. (A.)

In Geol. Surv. Ky., Part ix., Vol. ii., 2d ser. Frankfort, 1876.

Boyle and Mercer Counties.

List of the flowering Plants and of the Ferns of Boyle and Mercer Counties. By W. M. Linney. (A.)

In Geol. Surv. Ky., Part xi., Vol. v., 2d ser. Frankfort, 1876.

North Cumberland, Bell and Harlan Counties.

List of Timber Trees of North Cumberland, Bell and Harlan Counties. By L. H. De Friesse. (A.)

In Geol. Surv. Ky., Part ix., Vol. iv., 2d ser. Frankfort, 1876.

TENNESSEE.

List of Timber Trees of Tennessee. By J. B. Killebrew and Prof. J. M. Safford. (B.)

In Report on Resources of Tennessee.

ALABAMA.

Preliminary List of the Plants growing without cultivation in Alabama. By Charles Mohr. (A.)

24mo, pamphlet, pp. 56. Tuscaloosa, 1880.

MISSISSIPPI.

Flora of Mississippi. By C. L. Wailes. (A.)

In 1st Rep. Agric. and Geol. Miss. 1854.

LOUISIANA.

Catalogus Floræ Ludovicianæ. By J. L. Riddell, M.D. (A.)

In N. O. Med. and Surg. Journ., Vol. viii. New Orleans, 1852.

Flora Ludovicianæ. By A. Featherman. (B.)

In Rep. of Bot. Surv. South. and Cent. La. New Orleans, 1871.
Plaquemines County.

List of Plants, native and introduced, of Plaquemines County, La.

Collected by A. B. Langlois. (A.)

8vo., pp. 4. No date.

ARKANSAS.

Collections towards a Flora of the Territory of Arkansas. By Thomas Nuttall. (C.)

In Trans. Am. Philosoph. Soc., Vol. v. Philadelphia, 1837.

A Catalogue of the Plants of Arkansas. By Leo Lesquereux.

In 2d Rep. of a Geol. Recon. of Midd. and South. Counties of Ark. Philadelphia, 1860.

TEXAS.

Plantæ Lindheimerianæ; an enumeration of the Plants collected in Texas, with remarks and descriptions of new Species. By George Engelmann, M.D., and Asa Gray, M.D. (C.)

In Journ. Bost. Soc. Nat. Hist., Vols. v. and vi.

Plantæ Wrightianæ Texano-Mexicanæ. An account of a Collection of Plants made by Chas. Wright, A.M., in an Expedition from Texas to El Paso in the summer and autumn of 1849. By Asa Gray. (C.)

In Smithson. Contrib. to Knowledge, Vols. iii and v.

Beiträge zur Flora von Texas. Von Adolf Scheele. (D.)

In Linnæa, Vols. xxi., xxii. xxiii., and xxv.

Plants collected during Capt. Marcy's Exploration of the Red River of Louisiana in 1852. By John Torrey, M.D. (C.) Washington, 1852.

List of the Fungi of Texas. By M. C. Cooke. In Ann. N. Y. Acad. Sci., 1878.

W. R. G.

N. L. B.

Notes from Nevada and Utah.—Mr. Watson identifies as *Podosciadium Bolanderi* a plant which has obcordate petals, and bracts tipped with an awn 4" long.

I was fortunate in getting good specimens of the extremely rare *Mentzelia congesta* at Hawthorn and Empire City, Nevada.

Antennaria Geyeri occurs in the mountains south of Reno, Nevada.

Pectocarya setosa occurs rather abundantly at Empire City, Nevada, and has geminate nutlets.

The Idaho plant, *Gentiana simplex*, occurs in the mountains of Southern Utah, as do also *Philadelphus microphyllus*, *Zygadenus glaucus* and *Iris Missouriensis*.

Sometime since, Dr. Gray directed the attention of botanists to the species of *Mentzelia* as fly catchers. Soon after, I had occasion to examine the leaves of *M. levicaulis* late in the fall. The leaves are thickly beset with coarse hairs, which are furnished with several pairs of barbs pointing downward along them; while the top has an anchor-shaped summit twice as large as the other barbs. These

hairs stand so close together that the barbs almost touch. Thickly studding the leaf were many dead and dying mosquitoes, specimens of aphids, and other small insects. Some of these were caught by the head, but most of them were held by the legs or proboscis, as their heads were too large to slip between the barbs. All were more or less mutilated, probably by other insects. A sweet fluid was secreted by the leaf, and this attracted the insects. There was no evidence of any digestion going on, as none of the victims could get close enough to the surface of the leaf to be touched by the fluid.

A good character lies in the seed of *Acer grandidentatum*. The cavity in which the embryo lies is spherical, and always remains so, while the cotyledons are simply folded. In *Acer glabrum* the seed-cavity is compressed and deeply reticulated, so that the seed is crumpled. The cotyledons are strongly coiled.

Salt Lake City.

MARCUS E. JONES.

Notes from Chemung County, N. Y.—In May, 1880, I collected an Umbellifer, which for some time I could not satisfactorily identify. The Rev. J. H. Wibbe, of Oswego, has now identified it for me as *Cherophyllum procumbens*, Lam. The only station known to me is in the town of Ashland, along the Chemung River, and it now is spreading along the south-west bank of the D. L. & W. Railroad track. This is its northernmost station, since Prof. Gray gives its geographical range as New Jersey, Illinois, and southward. I also found, last season, *Kaleria cristata*, Pers., on Sullivan Hill in this County. Correspondence and exchange are desired. I wish a specimen each of *Lygodium palmatum*, Swz., and *Asclepias rubra*, L.

Elmira, N. Y.

THOS. F. LUCY.

A large Amelanchier.—I have recently discovered a shad-tree (*Amelanchier Canadensis*) standing in a meadow in the town of Glastonbury in this State, of the size, proportions and general appearance of an uncommonly fine old sugar-maple. The tree was subsequently measured by my friend Dr. G. W. Russell, of this city, who found its girth to be 8 ft. 8 inches, at 3 ft. 6 inches from the ground, and the spread of its branches to be 48 feet in diameter. The tree was in full bloom on the 19th inst.

Hartford, Conn., May 30th.

G. P. DAVIS.

Funnel-shaped Leaves in Trifolium.—Miss Grace S. Hadley sends to us from Middlesex, Mass., specimens of *Trifolium pratense* which are provided, between the leaflets, with petioles that bear one or two smaller leaflets whose margins have cohered so as to form a conical cup or funnel.

Dr. Masters (Veg. Teratology) states that he has frequently met with specimens of *Trifolium repens* in which, on each side of the base of the petiole, the stipules had the form just indicated.

Abnormal Flowers.—Mrs. C. T. Tracy sends to us from Ripon, Wis., a sketch and description of a flower of *Trillium cernuum*, L., which has one petal and two sepals of the ordinary form and color, while the third sepal has been replaced by a perfect leaf, and the other two petals have a green stripe through the centre. Mrs. Tracy says: "A member of my botany class found a flower of *Sanguinaria Canadensis* with twenty-five petals, and a corresponding diminution of stamens. It was found among others that were in normal condition."

Botanical Notes.

On the Relation of Heat to the Sexes of Flowers.—At a meeting of the Botanical Section of the Philadelphia Academy of Natural Science, on April 9, Mr. Thomas Meehan referred to his past communications to the Academy, showing that in monœcious plants female flowers would remain at rest under a temperature which was sufficient to excite the male flowers to active development. Hence a few comparatively warm days in winter or early spring would bring the male flowers to maturity, while the female flowers remained to advance only under a higher and more constant temperature. In this manner the explanation was offered why such trees were often barren. The male flowers disappeared before the females opened, and the latter were unfertilized. He referred especially to some branches of *Corylus Avellana*, the English hazle-nut, which he exhibited before the Section last spring, in which the male flowers (catkins) were past maturity, the anthers having opened and discharged their pollen, and the catkins crumbling under a light touch, but there were no appearances of action in the female flower-buds. There were no nuts on this tree last season. The present season was one of unusually low temperature. There had not been spasmodic warmth enough to bring forward the particularly excitable maple-tree blossoms. The hazle-nut had not, therefore, had its male blossoms brought prematurely forward. He exhibited specimens from the same tree as last season, showing the catkins in a young condition of development, only half the flowers showing their anthers, while the female flower-buds had their pretty purple stigmas protruding from nearly all of them.

Mr. Meehan remarked that his observations the past few seasons had been so carefully made that he hardly regarded confirmation necessary, but believed the further exhibition of these specimens might at least serve to draw renewed attention to his former communications.

Cooke's Illustrations of British Fungi.—American subscribers to this work will regret to be informed that the premises of the plate-printers were recently destroyed by fire, and, with them, all the work in progress, including Part xviii. of the "Illustrations," which had just been completed. This will cause uncertain and unavoidable delay, but, as soon as possible, some arrangement will be made to continue the works on fungi and fresh-water algæ.

Botanical Literature.

We acknowledge, with thanks, receipt of the following papers from their authors :

- The Bacteria* : An Account of their Nature and Effects, together with a Systematic Description of the Species. By T. J. Burrill, Ph. D. 8vo, pamph., pp. 65. (From the 11th Rep. of Illinois Indust. University.)
- The Mycologic Flora of the Miami Valley, Ohio.* By A. P. Morgan. 8vo, pamph., pp. 30. (Reprint from the *Journal* of the Cincinnati Society of Natl. History.)
- The Physiology of Protoplasmic Motion.* By F. H. Engelmann, M.D. Translated by C. S. Dolley, M.D. 8vo, pamph., pp. 40. Rochester : Davis & Leyden.
- Comparative Tables showing the Distribution of Ferns in the United States.* By Geo. E. Davenport. 8vo, pamph., pp. 8. (From the *Proceedings* of the Amer. Philosoph. Society.)
- The Growth and Structure of a Tree.* By Prof. W. J. Beal. 8vo, pamph., pp. 8.
- Cases of Mushroom Poisoning.* By James D. Trask, M.D. 8vo, pamph., pp. 8. (Reprint from the *American Journal of the Medical Sciences*.)
- Some Microscopic Distinctions between Good and Bad Timber of the same Species.* By Dr. J. T. Rothrock. 8vo, pamph., pp. 6. (From the *Proceedings* of the Amer. Philosoph. Society.)
- On the Structures which favor Cross-Fertilization in several Plants.* By William Trellease. 8vo, pamph., pp. 31. (From the *Proceedings* of the Boston Society of Natural History.)
- Catalogue of the Davenport Herbarium.*—Supplement. March, 1883. By George E. Davenport. 8vo, pamph., pp. 8.
- A Revision of the Genus Clematis of the United States*, embracing Descriptions of all the Species, their Systematic Arrangement, Geographical Distribution and Synonymy. By Joseph F. James. 8vo, pamph., pp. 19. (From the *Journal* of the Cincinnati Soc. Nat. Hist.)
- Some Algae of Minnesota supposed to be poisonous.* By J. C. Arthur. 8vo, pamph., pp. 12. (From the *Bulletin* of the Minnesota Acad. Nat. Sci., Voi. xi.)
- Descriptions of Iowa Uromyces.* By J. C. Arthur. 8vo, pamph., pp. 37. (From the *Bulletin* of the Minnesota Acad. Nat. Sci., Vol. xi.)

Correction.—Mr. Ravenel wishes to correct an error which he inadvertently committed in his note on the Jerusalem artichoke (p. 55), and which we carelessly allowed to pass unobserved, and that was the classing of the sweet with the Irish potato as an underground stem. All reference to the sweet potato should, of course, be erased from the article.

BULLETIN
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New York, July, 1883.

[No. 7.]

New Species of Fungi.

By CHAS. H. PECK.

Quas

BOLETUS MORGANI (Plate xxxv.)—Pileus pulvinate, soft, glabrous, viscid, red or yellow, or red fading to yellow on the margin; tubes convex, depressed about the stem, rather long and large, unequal, subrotund, bright yellow becoming greenish yellow; stem elongated, tapering upward, adorned with long, narrow reticulations, yellow, the depressions red; the flesh of stem and pileus whitish tinged with red and yellow; not changing color when cut or bruised; spores olive-brown, .0007 to .0009 of an inch long, about half as broad.

Plant 4 to 6 inches high, pileus 1.5 to 2.5 inches broad, stem 3 to 6 lines thick.

Rocky hillsides, in woods of chestnut, oak and tulip-trees. Norwood, Kentucky. August. A. P. Morgan.

The color of the pileus is usually red on a yellow ground, and that of the stem is yellow on the elevations or ridges, and red in the depressions. The red disk of the pileus sometimes fades into yellow on the margin. In wet weather the anastomosing ridges of the stem swell out and become broadly winged, thereby giving the stem a peculiar shaggy or lacerated appearance. The species is related to *B. Russellii*, Frost, from which it is readily separated by its glabrous, viscid pileus and its longer spores. The two species constitute a natural section or subgenus, which is, so far as now known, peculiar to this country, and to which may be ascribed the following name and diagnosis:

§ **LACERIPEDES.** *Stem elongated, strongly venose-reticulated, the veins intumescent in wet weather.*

Pileus dry, hairy or tomentose-hairy, - - - *B. Russellii*, Frost.

Pileus viscid, glabrous, - - - - - *B. Morgani*, Peck.

HEXAGONA FAVOLOIDES.—Pileus thin, coriaceous, sessile, narrowly and concentrically zonate, slightly sulcate, glabrous, somewhat shining, brown; pores pallid, then brownish, shallow, hexagonal, .028 to .042 of an inch across.

Decaying wood. Roatan Island. J. J. Brown, M.D.

Allied to *H. polygramma*, Mont., and *H. tenuis*, Hook., but unlike either in color and in the character of the margin of the pileus. In its color, and in the character of the zones of the pileus, our species very much resembles fresh specimens of *Dædalca confragosa*, Pers., from which it is separated by its thin pileus and the character of the hymenium. The pores are scarcely half a line in diameter and are

so regularly hexagonal as to be suggestive of the cells of a honey-comb. The zones of the pilcus are narrow and subconcolorous.

MELANCONIUM POPULINUM. — Pustules prominent, eruptent through a longitudinal chink; stroma whitish, minute or obsolete; spores oblong, black, .0006 to .0007 of an inch long, oozing out and staining the matrix black or forming a black globule.

Dead branches of poplar-trees. Iowa. J. B. Ellis. (No. 3,637).

MELANCONIUM COLORATUM. — Pustules small, scarcely prominent; stroma minute, greenish-yellow; spores oblong or oblong-ovate, often slightly curved, nearly colorless, .0005 to .0006 of an inch long, .00025 to .0003 of an inch broad, oozing out and forming a dull-reddish mass.

Bark of the tulip-tree, *Liriodendron Tulipifera*, Pennsylvania. J. B. Ellis. This species is related to *M. pallidum*, Pk., but the spores are smaller and the spore-masses of a different color.

UROMYCES UNITUS. — *Hymeniferous form*: Spots suborbicular, sometimes confluent, varying in color from yellow to sanguineous; peridia amphigenous, short, sometimes crowded and occupying the entire spot, sometimes concentrically arranged near the margin; spores subglobose to subelliptical, orange-yellow, .0008 to .001 of an inch long.

Teleutosporous form: Sori amphigenous, on the same spots as the *Æcidium* and intermingled with its peridia, slightly prominent, orbicular, blackish-brown; spores globose, minutely granular, .001 to .0011 of an inch in diameter; pedicel very short, hyaline.

Living leaves of *Calandrinia Leana*, Porter. Washington Territory. T. S. Brandegee.

RÆSTELIA INTERVENIENS. — Spots suborbicular, pallid or yellowish; peridia hypophyllous, short or moderately elongated, whitish or pale yellow, lacerated and splitting to the base, the cells thick and rough with striations; spores (when dry) very pale or whitish, subglobose, .0008 to .0012 of an inch in diameter, minutely rough, the epispore thick, .00016 to .00025 of an inch; spermogonia on the same spots, epiphyllous.

Living leaves of *Malvastrum Thurberi*, Lower California. April. C. G. Pringle. Also on leaves of *Erodium* (?) in Southern California. May. M. E. Jones.

The spores, in the dried specimens, are nearly white, but in the fresh state they are probably yellow or orange. The fungus at first sight might be taken for an *Æcidium*, a genus with which its pale spores and short peridia connect it, but the latter split to the very base as in the genus *Ræstelia*. The species, however is probably only the hymeniferous state of some teleutosporous fungus. This last remark is also applicable to the following *Æcidia*.

ÆCIDIUM AURIELLUM. — Peridia numerous, short, crowded, generally occupying the whole lower surface of the leaf, pale or yellowish, the mouth entire or subcrenulate; spores subglobose or subelliptical, golden-yellow, .0008 to .0011 of an inch long, usually containing one to three large, shining, yellow oil-globules, epispore thin.

Living leaves of *Cheiranthus Menziesii*, B. & H. Carson, Nevada. June. M. E. Jones.

This is a pretty fungus and very showy, even in the dried state, by reason of the clear golden-yellow color of its spores.

ÆCIDIUM ISOMERINUM.—Spots pallid, thickened; peridia amphigenous, short, scattered or crowded; spores subglobose, ovate or elliptical, whitish (when dry) .0008 to .0011 of an inch long, epispore thin.

Living leaves of *Isomeris arborea*, Nutt. San Diego, California. March. M. E. Jones.

Sometimes the fungus occupies nearly the whole leaf, which, in such a case, is considerably thickened and distorted.

ÆCIDIUM ANISACANTHI.—Spots none or indistinct; peridia amphigenous, elongated, pinkish-gray, crenately lacerated at the apex; spores very variable in shape, subglobose, ovate, elliptical, oblong or oblong-pyriform, sometimes pointed at one end, yellowish or brownish yellow (in the dried state) .0009 to .0018 of an inch long, .0008 to .00095 broad.

Living leaves of *Anisacanthus Thurberi*. Arizona. June. C. G. Pringle.

SPHÆRELLA ARBUTICOLA.—Maculicolous, spots suborbicular, unequal, blackish or subcinereous, brown on the lower surface of the leaf; perithecia minute, black, epiphyllous, scattered or collected in small groups, piercing the whitened epidermis; asci oblong, sometimes narrowed above, .0016 to .005 of an inch long; spores crowded, narrow, colorless, uniseptate, .00045 to .0006 of an inch long, .00016 broad.

Dead leaves of *Arbutus Menziesii*, Pursh. Santa Cruz, California. July. C. G. Pringle.

The septation of the spores is rather obscure, but this is probably due to their being immature. The epidermis is slightly elevated around the perithecia and has there a whitish appearance.

MICROSPHÆRIA ERINEOPHILA.—Mycelium arachnoid, subpersistent; perithecia .003 to .004 of an inch broad, sometimes collapsed or pezizæform; appendages 6 to 12, shorter than or about equal to the diameter of the perithecia, colored, the tips paler and two to three times dichotomous; asci 4, sometimes 3 or 5, eight-spored; spores .0008 to .0009 of an inch long, .00045 to .0005 broad, usually containing one or two large nuclei.

On the *Erineum* of beech-leaves. Illinois. F. S. Earle and Prof. A. B. Seymour.

This fungus is closely related to *M. penicillata*, of which perhaps it may be a mere variety, but it is readily distinguished by its colored appendages and nucleated spores. Its habitat is very peculiar. In all the specimens seen it occurs only on the *Erineum*.

Proterogyny in *Spartina juncea*.—Has this been noticed? My attention was attracted to it this morning on the beach here. The plumose stigmas of all the spikes on a particular plant are protruded, while the stamens are still full and retained in the palets. In other plants where the purple anthers are prominent, I find the stigmas withered.

Buttonwoods, R. I.

W. W. BAILEY.

Dues

New Species of Fungi.

By J. B. ELLIS and BENJAMIN M. EVERHART.

STEGANOSPORIUM FORMOSUM.—The receptacles enclosing the spores imbedded in the inner bark and resembling true perithecia, depressed-globose (1^{mm}), the apex adnate to the epidermis, which is there perforated to form an outlet for the spores, which are expelled at maturity in slender cirrhi, like fine black hairs, or collected in an incrusting mass around the orifice; spores broad, oblong-fusiform, $60-100 \times 20-26 \mu$, yellowish at first, soon becoming dark brown and muriform, the obtusely pointed ends subdiaphanous, borne on the apices of hyaline, jointed basidia, which spring from the inner surface of the cavity, the whole involved in mucus, and the spores at first with a broad, gelatinous envelope.

On dead branches of *Magnolia acuminata*, West Chester, Pa. On the same branches there is a *Melanconium* (?) with elliptical, uniseptate, $10-12 \times 4 \mu$. spores. E. H. S. & G., No. 411.

STICTIS DECIDUA.—Scattered, membranaceous, cup-shaped, elliptical, $.3-.5^{\text{mm}}$. $\times .6^{\text{mm}}$. reddish brown, nearly closed at first by the incurved margin, at length open and finally deciduous; asci oblong, $35-40 \times 6-7 \mu$; paraphyses branched (?) and matted above, and bearing at their tips minute globose conidia; sporidia biseriata, fusiform, nucleolate, nearly straight, hyaline, $6-10 \times 1-15 \mu$.

On decorticated and decaying pine limbs lying on the ground. Newfield, N. J., March 1883.

Closely allied to *S. foveolaris*, Rehm, but distinguished by its different habitat, darker disk and deciduous habit.

GLONIUM TRIBLIDIODES.—Emergent, oblong, ends obtuse, $1-2^{\text{mm}}$. $\times .5-.75^{\text{mm}}$, lips incurved, smooth, distant, leaving the sooty disk more or less permanently exposed; asci clavate-cylindrical, sessile, $80-90 \times 9-12 \mu$, overtopped by the densely matted paraphyses, whose closely compacted, dark colored tips give the sooty color to the disk; sporidia uniseriate or partly biseriata above, ovate, uniseptate hyaline, $12-16 \times 5-7 \mu$. In the fresh state the swollen disk entirely hides the margin.

On old fence-rails. Washington Territory. W. N. Saksdorf.

CENANGIUM ASTERINOSPORUM.—Erumpent, forming tuberculi-form clusters $2-3^{\text{mm}}$ in diameter and composed of 6-10 individuals closely crowded together so as to become angular and distorted from mutual pressure; disk convex or plane, black, smooth, immarginate, ($.5-1^{\text{mm}}$), dirty white within; asci subglobose, 35μ in diameter; paraphyses (?); sporidia oblong-elliptical or subpyriform, subhyaline, granular, constricted in the middle, becoming 3-septate and submuriform, $15-20 \times 6-8 \mu$.

On living stems and branches of *Vaccinium corymbosum*. Newfield, N. J., throughout the year. The clusters are erumpent from the inner bark and do not appear to affect the wood beneath.

PEZIZA CRINELLA.—Scattered, stipitate, pruinose, white, thin and very delicate; disk $.25-.375^{\text{mm}}$ in diameter, margin fringed with short hairs, stipe scarcely equal in length to the diameter of the disk; asci oblong-cylindrical, $38-40 \times 4-5 \mu$, sessile; paraphyses (?); sporidia biseriata, clavate-fusiform, hyaline $9-12 \times 2 \mu$.

The tips of the fibres which form the cup project and form the marginal fringe. From *P. caricinnella*, Karst., to which this is closely allied, it differs in its narrower asci and smaller, simple, clavate sporidia. *P. Caricis*, Desm., has sporidia cylindrical, straight or curved, $6 \times 1 \mu$.

On dead leaves of *Carex crinita* lying partly in water, on the banks of a rivulet in shady woods. West Chester, Pa., June, 1882. E. H. J. & G., No. 381.

NECTRIA CONIGENA.—Minute, membranaceous, smooth, orange-yellow, lighter and collapsing when dry; asci about $50 \times 7 \mu$; sporidia uniseriate or partially biseriate above, acutely elliptical, 2-nucleate, becoming uniseptate (?) $7-8 \times 3-35 \mu$; ostiolum papilliform, minute. Perithecia with a few weak, white, radiating hairs at base.

Differs from *N. vulpina*, Cke., in its habitat, smaller and paler perithecia and rather narrower and more acute sporidia.

On old decaying cone of *Magnolia glauca*. Newfield, N. J., Oct., 1882.

A List of Grasses from Washington Territory.*

By F. LAMSON SCRIBNER.

GLYCERIA CANBYI, *n. sp.*—Perennial; culm 2—3 ft. high, stout, erect, simple, smooth; sheaths shorter than their internodes, smooth; leaves of the culm 3, flat, between 2 and 3 lines wide, the upper about 6 in. long, scabrous on both sides and especially rough on the back near the briefly involute, pungent tip; ligule broad, obtuse, 2—3 lin. long; panicle narrow, about 6 in. long, densely flowered, usually interrupted below, branches from 3—5 in a half-whorl, short (1—2 in.) and erect or ascending; spikelets 3 lines long, 3—5-flowered, the rhachis readily breaking up; outer glumes unequal, obtuse or acute, 3-nerved, the upper and larger one between 1 and 2 lines in length; flowering-glume about 2 lines long, strongly scabrous and rounded, 5-nerved, nerves terminating below the scarious and obtuse summit; palea a little shorter than its glume, shortly ciliate on the nerves.



Fig. 1



Fig. 3



Fig. 2



Fig. 4

(Figs. 1 and 2. Spikelets. Fig. 3. Outer glumes. Fig. 4. Anterior view of floret.)

Cascade Mts., Washington Terr., Frank Tweedy and T. S. Brandegee, August, 1882.

Allied to *Atropis tenuifolia*, Thurber, and closely resembling some forms that have been referred to that species, as No. 634 of E. Hall's Oregon collection, but differing essentially from descriptions of that species and very unlike the specimens in the herbarium of the Philad. Acad. Nat. Sci. ticketed *Poa tenuifolia* by Nuttall himself.

* Continued from page 66.

Glyceria nervata, Trin.

Glyceria pauciflora, Presl.

Glyceria pallida, Trin.

Festuca microstachys, Nutt.

Festuca ovina, Lin.

Festuca rubra, Lin.

Bromus racemosus, Lin.

Bromus secalinus, Lin.

Bromus breviaristatus, Thurber, Bot. Wilkes's Exped., 493; *Cera-
tochloa*, Hook.; Thurber, Bot. Cal. ii., p. 321.

Bromus Hookerianus, Thurber, Bot. Wilkes's Exped., 493; *Cera-
tochloa grandiflora*, Hook.; Thurber, Bot. Cal. ii., p. 321.

Agropyrum repens, Beauv. (*Triticum*, Lin.) Represented in the collection by several forms, one of which has the sheaths and leaves, as well as the lower portion of the culm, clothed with a soft pubescence.



Agropyrum dasystachyum (*Triticum*, Gray; *Triticum repens*, var. *dasystachyum*, Hook.) The specimens accord well with the description of *A. dasyanthum*, Schultes, and, if kept distinct from *A. repens*, perhaps should be referred to that species. The spikelets are sometimes developed abnormally, and one of these is shown in the annexed figure.

Agropyrum caninum, Reichenb. (*Triticum*, Lin.) Both the ordinary or typical form and the mountain form referred to by Dr. Thurber, in Bot. Cal., ii., p. 324, characterized as having large and spreading, usually much crowded spikelets with long, stout divergent awns. Equals No. 656 of Hall & Harbour's coll., 1862.

Agropyrum divergens, Nees. (*Triticum strigosum*, Lessing.) Equals 657 of Hall & Harbour's coll., 1862.

Hordeum nodosum, Lin. Thurber, Bot. Cal., ii., p. 325, (*H. pratense*, Huds.)

Hordeum murinum, Lin.

Elymus Canadensis, Lin.

Elymus Sibiricus, Lin.; equals No. 651 of E. Hall's Oregon coll.

Elymus condensatus, Presl.

Elymus Sitanion, Schult. (*Sitanion elymoides*, Raf.)

The Forms of Leaves.—Mr. Grant Allen's interesting papers on this subject must have engaged the attention of all evolutionary botanists, and very many serious doubts must be felt as to the alleged adequacy of his theory to explain the multifarious and composite variations in leaf-forms. Having been attracted lately by the modifications of form to be found in the leaves of *Rhus toxicodendron*, it appeared to me possible to find in this common plant a point of exception to Mr. Allen's hypothesis. Mr. Allen assumes, putting the supply of atmospheric moisture out of the question, or assuming it to be uniform and sufficient, that a competition between neighboring leaves for the possession of carbon molecules, represented in the air by

carbonic anhydride gas, causes unequal growth along their mutual limits and their outlines become broken and assume irregular shapes; segments growing faster than others produce the diversified serrations, elongations, partings and fimbriations which characterize the leaves of different plants, all this however taking place in subordination to the ancestral peculiarities of the plant by which a general ground form or architectural type is preserved. Looking at the leaves of *R. toxicodendron*, we find them arranged in pedunculated, terminal sets of three, one distal and two lateral leaflets. The distal or central leaflet normally, and putting aside the divergent shapes found in this plant, is rhombic-ovate, equilateral, and symmetrically toothed on each side, the two side and proximal leaflets are subrhombic-ovate, inequilateral, and toothed conspicuously on only one side of the free margin. In other words, along the edges of the two lateral leaves where they come in conflict, especially with the edges of the terminal leaf, a restriction of growth takes place, and the usual lobation seen in the end leaf, and which may be considered typical, is suppressed, and on the margin, which is relieved from any competition, this lobation appears. Does not this contradict Mr. Allen's assumption? That there is a struggle for nourishment and that the terminal leaf, in the direct line of the sap's flow, is favorably placed, is seen by the slight growth of the halves of the side-leaflets facing the former, and the natural character of the halves away from it. But the tendency is to obliterate serration at the parts mentioned, and might, we should suppose, under persistent repetition, form an entire edge. A very similar condition of things, with some interesting details, is seen in the leaf-clusters of *Negundo aceroides*.* An interesting change of form in the leaves of the poison ivy takes place when they have been stung by a species of gall-insect (?) at the apex of a leaf. In the terminal leaf it produces an arrest of growth, a deep cleft, and lateral enlargement, which destroys the notched outline, enveloping the lobes in a rounded full blade.

Of course it is not difficult to explain the abortive character of the one side of the leaflets mentioned above. It is due to the predominant shade caused by the expanded sides of the terminal leaflet, which owes its vigour to its favorable position. The conditions presented here are apparently what Mr. Allen would wish, two neighboring leaves contending for the molecules of carbonic anhydride and evidently unequally matched, as appears from the result; but the result does not seem desirable for his theory, as the characteristic toothing is suppressed, not exaggerated in the weaker, and this notching, which he seems to regard as due to impeded growth, is best shown in the stronger competitor.

L. P. GRATACAP.

The Fertilization of *Opuntia*.—For the purpose of adding brilliancy of color to the window-garden in front of my house, I planted in two separate boxes a large number of plants of *Opuntia vulgaris*, which I obtained from near Hartsdale, Westchester County, N. Y.,

* Mr. A. Hollick gave me the name of this tree, which I had previously observed in connection with this subject.

on the 15th of June last. All the plants when taken up were well set with large flower-buds, which opened a week later and lasted until the middle of July. During that time I watched about one hundred and thirty flowers out of a total of two hundred and ten during their period of flowering, and noticed with much interest the great sensitiveness of the stamens, which are very numerous in this prickly-pear.

The window-boxes have an eastern exposure, and consequently the sun passes out of view about one o'clock in the afternoon. The flowers opened about seven in the morning and closed shortly after two, or about an hour after the sun passed away, although they would have remained open two hours longer under its direct influence. During sunshine each flower would open for two consecutive days, but in cloudy weather for only one day. On the first day of the opening of a flower the pointed stigmas were hardly separated sufficiently to admit of the passage of a small-sized straw. But on the following day, under the influence of the sun's rays, the stigmas expanded to their fullest capacity.

Less pollen was observable on the anthers during the first than on the second day of flowering. Or, in other words, the longer a flower remained open the greater the number of pollen grains that were discharged from the anthers. And yet fructification seems to have been effected in nearly every case in which a flower opened for either one, or two days in succession. I now count about one hundred and ninety promising fruits.

The beautiful lemon-colored flowers of this *Opuntia* attracted many honey-bees, and their movements I carefully watched with a pocket-lens in hand on every fair or sunny day. A bee would alight on the mass of anthers, then push its forelegs down among the filaments, which were sufficiently compressed to admit of the body of the insect passing more readily down to the nectaries of the flower.

As soon as the filaments were released from the grasp of the insect, the stamens were suddenly thrown against the pistil, from which they slowly receded to their former position. I should judge that sometimes more than a dozen stamens were thus rudely seized by a honey-bee in its endeavor to reach the nectaries, the insect frequently making the circuit of the whole arrangement of stamens, and always coming up again to the surface of the anthers before taking a second plunge to the base of the corolla. Although the feet (legs) of the insect were covered with masses of pollen after visiting a flower, yet at no time do I remember seeing one crawl *over the stigmas*, whereby fertilization might have been insured. It seems to me that the pollen grains are thrown between the stigmas after the sudden movement of the stamens following the retreat of an insect.

I have also noticed flies of several species visit these flowers on a similar errand, this apparently being followed by the same movements of the filaments. On the 12th of July, I was collecting in Pelhamville, Westchester County, and there also observed a few late-flowering specimens of *Opuntia vulgaris*, on one of which I observed a large humble-bee going for his nectar; and how he did make the dust (pollen) fly!

From one of the joints of my plants there has exuded a straw-colored gum. The gum found on *Opuntia* is edible like that secreted by *Acacia vera* and *Prunus cerasus*.

New York, July 18th.

RICHARD E. KUNZÉ.

Among the Palms and the Pines.—On the 28th of May, 1883, my father, H. C. Orcutt, and myself left San Diego City, Cal., on what proved a short trip into Lower California.

The first day rewarded us with two beautiful Abutilons with orange-colored blossoms and velvety leaves (*A. Berlandieri*, Gray, var., and another) and a new species of *Cordylanthus* found at the head of Tia Juana Valley near the boundary.

A little beyond, among the hills, was *Lupinus gracilis* among the rocks in company with *Phacelia Parryi*, both struggling for existence in so "dry a year," while further along we found *Acanthomintha ilicifolia*, the beautiful *Chorizanthe procumbens*, *Breweria minima*, and others, thriving on the adobe hills (the whole surface of the latter cracked like the bottom of a dry mud-puddle), and, on similar ground, acres were covered with the red-flowered *Chorizanthe fimbriata*, forming a beautiful feature in the landscape as we entered Valle de los Palmas where we made our next camp among the mesquite, screw-bean and other trees—but no palms!

The next morning we proceeded through the valley till we noticed at our right, in a large cañon, two novel trees which proved to be palms, *Washingtonia filifera*, and on further exploration we found twenty still standing, but over fifty lying dead—cut down by the enterprising ex-governor that he might cover his house with their leaves!

Beneath the few remaining palms flowed a cool stream of water, enabling *Epipactis gigantea* and *Juncus xiphioides* to exist, while near by we found the last flower of *Lathyrus splendens*, *Lupinus albicaulis* as a small shrub, *Bærhavia viscosa*, *Galium pubens*, Gray, and others. *Mentzelia micrantha*, Torr. & Gray, with *Physalis crassifolia* were growing on the side of the cañon, the *Mentzelia* covering my clothes with its very tenacious brittle leaves which it was impossible to wholly remove.

May 31st found us in the evening at rancho Guadalupe, 75 miles from San Diego by road, where we made our headquarters for a day, till our return. Here, in the evening, we found a new (?) *Phacelia* with white flowers and yellow centre which had strayed to the dry bed of the San Antonio Creek, where in the morning I also found an abundance of *Astragalus Sonoræ*, Gray, in fruit, and *Lupinus gracilis*.

Late in the morning of June 1st we left the camp and proceeded up the valley till we came to a cañon which led to Guadalupe Mountains, credited with an altitude of 4,000 feet. Here we found many interesting plants at different altitudes. Among them were *Trichostema Parishii*, Vasey, *Mimulus Palmeri* (?), *Helianthus gracilentus*, Gray, *Actinolepis Wallacei*, Gray, at a low altitude, *Calochortus Weedii*, *C. venustus* above it, and, higher still, *C. Palmeri*, an *Allium*, *Dendromecon rigidum*, and many species of *Gilia*, one (a new species) being particularly conspicuous for its delicate, variegated blossoms.

After securing, near the top, specimens of the pine (*Pinus Coulteri*) which had attracted our attention we returned to the ranch, having walked about twenty miles in ten hours in the hot sun—repaid by over twenty interesting plants. During our return we found *Polycarpon depressum*, Nutt., *Monardella linoides*, Gray, and others, near Palm Valley, over one hundred species, two or more new, on the whole trip of eight days.

San Diego, Cal.

C. R. ORCUTT.

***Pinus Banksiana*, Lamb.**—This tree appears to considerably exceed the size given for it in our manuals of botany. Dr. Gray gives it as “a straggling shrub, or low tree, 5 to 20 feet high”; Dr. Wood as “a small tree”; Prof. Sargent, in his Catalogue of the Forest Trees of North America, says: “a low shrub or tree, rarely exceeding 20 feet in height.” The Abbé Provancher's *Essences Ligneuses de la Province de Quebec* gives 30 to 40 feet as its maximum size.

I noticed, in July, many trees in the vicinity of Marquette, Mich., which were at least 70 feet high, rising straight up from a base over one foot in diameter.

N. L. BRITTON.

***Clematis Viorna*, var. *coccinea*.**—Some time early in June of this year, on a trip to Chattanooga, I was fortunate enough to find on the side of Lookout Mountain, above the line of the Chatt. & Nash. R.R., two plants of *Clematis Viorna*, var. *coccinea*. They were strong and healthy and growing and blooming freely. It was a matter of astonishment to find here a species which has not, I believe, been before recorded east of Texas. The two known localities there are Austin and New Braunfels; and it is interesting to now find the form so far away from the only place where it has hitherto been found.

Cincinnati, O., July, 1883.

JOS. F. JAMES.

Abnormal Cotyledons in *Ipomæa*.—I find in my garden a seedling of the morning-glory, *Ipomæa purpurea*, with what appears to be a supplementary cotyledon. The condition is better described by saying that one cotyledon is perfect, but that the other consists of *two* which are connate to near the middle. This is as if the plantlet had started with three cotyledons. The abnormal one has, in consequence, a triply retuse apex. The accompanying figure shows the condition.



Masters says, that “fusion frequently accompanies an increase in the number of cotyledons,” and attributes the phenomenon, at least in some cases, to chorisis or to a cleavage of the original cotyledon. The venation in my own example would indicate the fusion of the two originally distinct leaves.

Providence, R. I.

W. W. BAILEY.

Botanical Notes.

Fertilization of the Borraginaceæ.—The change of color in various borraginaceous flowers would seem to bear relation to their fertilization. Hermann Müller remarks in *Nature* (May 24, p. 81), that he has observed that insects visit exclusively those which are red or just beginning to change to blue. All the blue flowers which he examined in a locality about 2 yards broad and 20 long, where many hundred flowers of *Pulmonaria* were in all stages of development, proved to be empty of honey, and all which he observed with the aid of a lens, had the stigma already supplied with pollen; so that it would appear that, as in *Lantana* and *Ribes aureum*, the change of tint serves as a guide to insects visiting the flower.

Contraction of Vegetable Tissues under Frost.—At a recent meeting of the Botanical Section of the Philada. Acad. Nat. Sciences, Mr. Meehan referred to a prevalent opinion that the liquid in vegetable tissues congealed as ordinary liquid does, and expanding, often caused trees to burst with an explosive sound. Mr. Meehan made experiments with young and vigorous trees, varying from one foot to three feet in circumference. They were carefully measured in early winter when the thermometer was at about 40°, and again after they had been exposed for many days to a temperature below freezing point, and, at the time of measurement, to 10° above zero.

In no case was there the slightest evidence of expansion, while in the case of a large maple (*Acer dasycarpum*), 3 feet 11½ inches around, there appeared to be a contraction of ½ inch. This was the largest tree experimented with. In dead wood soaked with water, there was an evident expansion; and the cleavage with explosion noted in the case of forest trees in high northern regions may result from the freezing of liquid in the central or less vital parts of the trunks of trees.

In some hardy succulents, however, instead of expansion under frost, there was a marked contraction. The joints or sections of stem in *Opuntia Rafinesquii* and *O. Missouriensis*, shrink remarkably with the lowering of the temperature. As soon as the thermometer passes the freezing point, the shrinkage is so great that the whole surface has the wrinkled appearance presented by the face of some very aged person. A piece of *Opuntia Rafinesquii*, which, in November measured 4 inches in length, is but 3½ now, and is not half the thickness it was in the autumn. In the winter when the thermometer was down to 10° above zero, the penknife penetrated the tissue just as easily as in summer, and no trace could be discovered of congelation in the juices of the plant. Other succulents exhibited more or less signs of shrinkage under extreme cold. *Mamillaria Nuttallii* and *M. vivipara*, with *Echinocactus Simpsoni*, a mamilliose form, drew the mammæ upwards, and had them appressed as closely as the spines would allow; and some species of *Sempervivum* did the same. This could only be accomplished by the contraction of the main axis from the apex downwards. *Sedum Hispanicum*, which has not a succulent axis, contracts its leaves into longitudinal wrinkles, presenting the appearance of being withered or dead. They expand again in a few days of temperature above the freezing

point. Specimens of this *Sedum* and of *Opuntia Missouriensis*, preserved just above freezing point under glass, did not shrivel; and a plant of *Echinocactus Simpsoni*, taken under cover, after the mammæ had been appressed by frost, expanded them to the summer condition in a short time afterwards.

Assuming from these facts that the liquids in plants which are known to endure frost without injury, did not congeal, it might be a question as to what power they owed this successful resistance. It was probably a vital power, for the sap of plants, after it was drawn from the tree, congealed easily. In the large maple-tree already referred to, the juice not solidified in the tree exuded from the wounded portions of branches and then froze, hanging from the trees as icicles often six inches long.

Photepinasty of Leaves.—W. Detmer proposes the term "photepinasty" for the epinastic position of leaves induced by light. The normal unfolding of the leaves is due to paratonic nutation. The light first induces stronger growth in the upper side of the leaf; and it is to this phenomenon that he proposes to apply the term. (*Journal Roy. Micros. Soc.*)

Reproductive Organs of Lichens.—The most recently published part of Minks's *Symbolæ Licheno-Mycologicæ* treats of the *Hysteriaceæ*, *Acrospereæ* and *Stictidææ*. On the asci and paraphyses together the author bestows the term "thalamium," the "thecium" being that portion of the apothecium which includes these organs. The structure of this portion of the lichen may be referred to three different types: (1) The asci and paraphyses are both fertile hyphæ, which, in the latter case, have undergone arrest of development; and there are all intermediate stages between the two. (2) The paraphyses are formed a shorter or longer time before the fertile hyphæ. They are at a certain period indistinguishable from the hyphæ of the fundamental tissues of the fructification, and there is here no true thalamium. To this class belong the true *Stictidææ* and the greater part of the *Hysteriaceæ*. (3) Certain genera exhibit an intermediate structure between the first and second.

The structure and mode of formation of the spores are described in detail; and it is shown that in the anthonimorphous type (*Hysterium Smilacis*, *Stictis versicolor*, etc.) the mother-membrane takes no part in the abstriction of the spores, but that a new membrane is formed, the old one becoming gelatinized.

The germination of *Lophium læviusculum* is described. After the destruction of the asci, the spores remain for a shorter or longer time in the fructification, where they germinate; passing over ultimately into a chroolepis-like gonidema, and not as would be the case if Schwendener's hypothesis were true, developing into a fungus.

The two different forms of ascus correspond to the two different forms of spores. When the ascus has a double wall, the inner layer of which ultimately gelatinizes, then the spore has only a single membrane; while when the ascus has only a single wall the spores have a double membrane, the outer layer of which gelatinizes. (*Journal Roy. Micros. Soc.*)

BULLETIN
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New York, August, 1883,

[No. 8.]

Notes on *Spartina*.

By F. LAMSON SCRIBNER.

(Plate XXXVI.)

Mr. Benthams, in his revision of the genera of Gramineæ, has removed *Spartina* from Chlorideæ and placed it in the Chamæraphis group of Paniceæ, associating it with the foreign genera *Chamæraphis* and *Xerochloa* of Brown, and with *Stenotaphrum*, Trin., represented in the Southern States by *S. Americanum*, Schrank. The student whose observations are confined to American grasses will see little in common between *Spartina* and *Penesetum* or *Stenotaphrum*, the former immediately preceeding and the latter following it; and he will be little inclined to accept this new arrangement as one that is at all *natural*. He will continue to feel that the relations of *Spartina* are with the Chlorideæ, a tribe in which it has heretofore been placed, and allow the fact of the articulation of the pedicels below the outer glumes as an exceptional character in this genus, as it is allowed in some others which are included in Poaceæ.

In defining the *Chamæraphis* group Mr. Benthams states that the spikelets are nearly those of *Panicum*, but with the fruiting-glume usually less hardened; the inflorescence is nearly that of the paspaloid *Panica* or of Chlorideæ, but distinguished from the former by the rhachis of the partial spikes or fascicles or branches of the panicle being produced beyond the spikelets into a more or less rigid point. From the Chlorideæ they are separated by the articulation of the pedicel below the spikelet.

Exceptional cases presenting this leading character of the Paniceæ, *i. e.*, the articulation of the pedicel below the outer glumes, occur in Poaceæ and in other tribes besides Chlorideæ, and may not *Spartina* form an exception here? There are exceptions also to the character cited by Mr. Benthams as separating the Chamæraphææ from the paspaloid *Panica*. In *Panicum tenuiculmum*, Chapman, (non Meyer) from Florida, and in the East Indian *P. mucronatum*, Roth. (two species which may prove to be identical) the rhachis of the lateral spikes or racemes is prolonged beyond the spikelets into a rigid, subulate mucro or point.

Without entering further into the question respecting the proper position of *Spartina*, which I feel in no wise competent to discuss, I would like to record here a few cases of abnormally developed spikelets of one species of this genus that have come under my notice, drawing no conclusions more than to state that my observations have led me to regard *Spartina polystachya*, Willd., rather as a variety of

S. cynosuroides, Willd., than as a distinct species. The characters based upon the spikelets alone are not sufficient to separate them.

The spikelets represented in Figures 1 and 2 of Plate xxxvi. were taken from a specimen of *S. cynosuroides* collected at the outlet of Moosehead Lake, Maine, by Messrs A. H. and C. E. Smith in 1868. The spikes of the plant are unusually long peduncled and very loosely flowered, but that it is an abnormal growth is well shown by the spikelets represented.

Figures 3, 4 and 5 were drawn from spikelets of a specimen in the herbarium of Mr. Wm. M. Canby, collected at Atlantic City, New Jersey. In habit the plant was like *S. polystachya*. Figure 5 represents a double spikelet which has two upper outer glumes with but a single lower one. Nearly all degrees of cohesion were to be found in different spikelets on the plant.

Figures 6, 7, 8 and 9 illustrate in detail a two-flowered spikelet taken from a specimen of *S. cynosuroides* collected in Oregon by E. Hall. Most of the spikelets were normal, but all degrees in the development of a second floret were exhibited by others, the one here illustrated being the most complete. In some the opposing edges of the pales of the two flowers were united for nearly their entire length. Fig. 6 shows the 2-flowered spikelet complete. Fig. 7 exhibits the outer glumes. Fig. 8 shows the two florets removed from the outer glumes. Fig. 9 shows the florets separated.

New Western Compositæ.

By EDWARD LEE GREENE.

BRICKELLIA CEDROSENSIS.—A low shrub, with ascending, leafy branchlets bearing usually a solitary head; larger leaves a half-inch long, triangular ovate, coarsely and sharply toothed, on short petioles; those of the branchlets narrower and mostly entire, all roughish pubescent; heads 12–18-flowered; involucre scales acute; akenes smooth; pappus finely barbellate.

Collected on the Cedros Islands many years since by Dr. Veitch, and preserved in the herbarium of the California Academy. The species is allied to *B. frutescens*, Gray, of the main land, north-east of the islands, which has entire, veinless leaves, and heads with more numerous flowers.

BÆRIA CARNOSA.—Simple, or more or less branched from the base; the root somewhat fusiform-thickened, but strictly annual; stems a span high, slender but wiry, purple, and sparsely clothed with rather webby, white hairs; leaves wholly glabrous, narrowly linear, subterete and, with the involucre, thick and succulent; involucre campanulate, their large fleshy scales marked with a prominent, keel-like midrib; akenes roughish; pappus of 5 ovate, acuminate, chaffy scales which taper into a long slender awn.

Collected by the writer on the border of a salt marsh at Vallejo, April 15th, 1883. A most remarkable species, as to its succulent herbage, recalling certain similarly fleshy, maritime species in other genera of compositæ, as, for example, *Layia carnosa*, H. & A.

LAGOPHYLLA CONGESTA.—Near *L. ramosissima*, but the stouter

stem usually simple; heads larger and numerous, in dense, glomerate clusters; floral leaves and involucre scales very villous, and beset with short-stipitate, or more commonly, quite sessile glands; akenes twice the size of those of other known species, and of a light grey; chaff of the receptacle united to the middle, thus forming a cup.

This interesting plant was collected by Dr. Kellogg in Mendocino County, Cal., as long ago as August, 1867, and is now in July, 1883, brought in from Mt. Yamulpais, near San Francisco, by that most diligent gatherer of rare Californian plants, Mrs. Kate Curran. Resembling *L. glandulosa* in being a glandular species, if these glands were overlooked; and, if it had a branching mode of growth, it would pass for a ranker *L. ramosissima*.

SENECIO CLEVELANDI.—Glabrous and glaucous; stem rather stout, $1\frac{1}{2}$ –2 feet high, few-leaved above and bearing numerous middle-sized, paniculate-corymbose heads; lower leaves numerous, rather succulent, ovate-oblong, entire, 2–3 inches long, tapering to long petioles; involucre broad, sparingly calyculate, its scales with lanceolate, acuminate, green tips; rays deep yellow; akenes short and small, prominently 4- or 5- angled.

Indian Valley, Lake County, Cal., D. Cleveland.

The following species, from another district, resembles this in foliage, but not otherwise, namely :

SENECIO LAYNEÆ.—Two feet high, glabrous throughout, strict and simple leaves mostly radical, linear lanceolate, entire, 3–4 lines wide, an inch or two long, on petioles of nearly equal length; the few cauline ones similar, though less obviously petiolate heads 5–7, corymbose, all but the central one on peduncles 2–3 inches long, large and showy; involucre campanulate, many-flowered, more than $\frac{1}{2}$ inch high, naked at base; rays 7–10, oblong-linear, $\frac{3}{4}$ inch long, orange-yellow; the merely convex style-tips bearing 3 or 4 conspicuous central bristles, and numerous shorter ones toward the circumference.

El Dorado County, Cal., on Sweetwater Creek, not far from Folsom; collected in May, 1883, by the very zealous and efficient Mrs. Kate Layne-Curran, to whom I gladly dedicate it. It is a near relative of the rare *S. Greenei*, Gray, thus far collected only by the writer, and that seven years ago, in the neighborhood of the geysers, in Sonoma County.

SENECIO ACTINELLA.—Acaulescent, at first arachnoid-woolly; leaves all radical, obovate to oblanceolate, spatulate, their margins strongly crenate-dentate, an inch or two long, including the broad petiole, and $\frac{1}{2}$ inch or more in breadth, coriaceous, veinless, at length glabrate, and persistent through the winter; scape solitary, 6–10 inches high, bearing a single large head; involucre campanulate, $\frac{1}{2}$ inch high, the calyculate scales few and wrapped in wool; rays 9–12, narrow, pale yellow; style-tips bristly-fringed.

Rocky woods in the northern part of Arizona, near Flagstaff; collected by H. H. Rusby, June, 1883. A fine new species, nearest to *S. canus*, from which it is distinguished by its crenate-toothed leaves, strictly monocephalous scapes, and large heads.

SENECIO ARIZONICUS.—Slightly webby-woolly at first, at length

glabrate; leaves mostly radical, numerous, and of a fleshy texture, ovate-oblong, obtuse, often a little cordate at base, strongly cuspidate-toothed, $1\frac{1}{2}$ inches broad, 3 inches long, on petioles of almost equal length; stem $1\frac{1}{2}$ feet high, slender, leafless, or with a few large and small bracts; corymb lax; heads middle-sized, on slender peduncles; involucre with a few almost filiform calyculate scales or bracts at base; rays 9-12, yellow.

Lynx Creek, in Northern Arizona, May 31st, 1883; collected by H. H. Rusby.

MICROSERIS ACUMINATA.—Near *M. Bigelovii*, but larger, the scapes more than a foot high, and rather stout; leaves pinnately parted into numerous, narrowly linear division; akenes only slightly contracted at summit, $\frac{1}{2}$ inch long; pappus $\frac{3}{4}$ inch long, consisting of 5 linear-lanceolate scales, each tapering very gradually into a short, slender awn.

Collected, in a few depauperate specimens, near Vallejo, in April 1883; and also, at about the same date, in the Sacramento Valley, by Mrs. Kate Curran, her specimens being of a strong, luxuriant growth. Dr. Gray informs me that it was even long ago collected sparingly by Bigelow, on Mark West's Creek, and that it has been referred, first to *M. Douglassii* and later to *M. Bigelovii*.

TRÖXIMON HETEROPHYLLUM.—This will apparently have to be the name of the North American plant which has been for some years past called *T. Chilense*, Gray. (Proc. Am. Acad., ix., 216, and Bot. Cal., i., 439.) The Chilian plant, for which Dr. Gray's specific name will be retained, differs in having considerably larger akenes, which are always all alike in the same head, and a shorter stipe to the pappus.

The North American plant runs into varieties so remarkable that, on two of them, so acute and able a botanist as Nuttall founded genera; and I even now doubt if they do not merit the rank of species. However, since my venerated friend Dr. Gray (who, by the way, has lately, and independently of my fresh specimens and notes, reached also the conclusion that our species is distinct from the Chilian) regards them as mere varieties, I here so place them; namely:

var. *CRYPTOPLEURA*.—Outer akenes nearly globose inflated and hardly striate, the inner of normal thickness and also barely striate, not at all winged. This is the *Cryptopleura Californica*, Nutt., and *Macrorhynchus Californicus*, Torr. & Gray. Although hitherto accounted very rare, and thought to be perhaps a merely abnormal state not likely to recur, I have this year found plenty of it in two patches a quarter of a mile distant from each other, though both within the limits of the town of Berkeley.

var. *KYMAPLEURA*.—Outer akenes with broad and strongly and beautifully undulated wings, the inner merely striate. This is *Kymapleura heterophylla*, Nutt., and also *Macrorhynchus heterophyllus*, of the same author. It is the most common form of the species in the central part of California.

Besides these striking varieties, which do not show any signs of running together, there are other forms, namely, one with akenes all

alike, and none of them much ribbed, another with the outer akenes ribbed (not corky-winged) and very hirsute.

The species should be collected abundantly in all localities where it occurs, and the specimens diligently compared. I regard it as an interesting subject of future investigation.

New Species of Fungi.

By J. B. ELLIS and B. M. EVERHART.

DIAPORTHE (VALSA) ELLISII, Rehm (*in lit.*).—Stroma cortical without any circumscribing line; perithecia numerous (15–20), .5^{mm}. in diameter, crowded, subcircinate, raising the bark into small pustules, through the centre of which bursts the brown convex disk pierced around its margin by the black, obtuse, dot-like ostiola; asci-subclavate, 57x8 μ ; sporidia biseriate or overlapping, narrowly elliptical, 4-nucleate, and often slightly constricted in the middle, 11–15x3.5–5.5 μ .

With a *Cytispora*, the spores of which are oblong, hyaline, 4-nucleate, 8–11x2–2.5 μ and issue in an orange-colored mass.

Closely allied to *Diaporthe carpinicola*, Fkl., and *Valsa Carpini*, Fr.

On dead branches of *Carpinus Americana*. West Chester, Pa. June, 1882. E. H. J. & G. No. 372.

VALSA LASIOSTOMA.—Perithecia circinating, .33–.5^{mm}. in diameter, globose, and tuberculose-roughened, lying on the surface of the inner bark, or slightly bedded in it, their long (100–150 μ), slender, cylindrical, decumbent necks converging and piercing the epidermis in a group, but not united in a disk; asci (spore-bearing part) 35–40x4–5 μ ; sporidia cylindrical, hyaline, nearly straight, 5–6 x 1.5–2 μ .

The ostiola are slightly swollen above, and, with the exception of the bare, black, obtuse tips, are covered with an olive-brown pubescence as in *Sphaeria barbirostris*, Dufour, from which this scarcely differs in any respect except in its circinate perithecia.

On decaying white oak limbs lying on the ground. Newfield, N. J. March, 1883.

CUCURBITARIA COREMÆ.—Perithecia at first subcuticular, but finally throwing off the epidermis, ovate, black, rough, .16–.33^{mm}. in diameter, ostiola broadly papilliform on obtuse conic; asci cylindrical, 150x15 μ ; sporidia uniseriate and oblique or partly biseriate, elliptical or oblong-elliptical, yellow at first, becoming finally deep brown, about 7-septate, with some partial longitudinal septa, and mostly constricted in the middle, 20–25x7–9 μ .

On dead branches of *Corema Conradii*. Willow Grove, N. J., November, 1883.

LOPHIOSTOMA STENOSTOMUM.—Perithecia scattered, globose, .25^{mm}. in diameter, covered by the fibres of the bark, which is pierced by the narrow, slightly compressed ostiolum; asci clavate-cylindrical, 75–90x6–7 μ ; paraphyses filiform, abundant; sporidia biseriate, fusiform, slightly curved, yellowish, nucleate and uniseptate at first, becoming 3-septate and more or less constricted at the septa, 18–22x3–3.5 μ .

Accompanied by a *Phoma* with small, subglobose spores in perithecia scarcely different from the ascigerous ones except in wanting

Dudy
Oct. 9 '83
1883

the prominent ostiolum. Differs from *L. subcorticale*, Eckl., in its narrow ostiolum and smaller sporidia.

On the inner surface of loosely hanging bark of grape-vines. Newfield, N. J. May, 1883.

SPHÆRIA (DIDYMELLA) RAUHLI.—Perithecia scattered or 2-3 together on the surface of the inner bark, and covered by the thin, loosened epidermis, which is pierced by the papilliform ostiolum; asci 35-30x6-7 μ ; paraphyses slender; sporidia biseriate, oblong-fusiform, uniseptate, constricted and slightly curved, with a faint, bristle-like appendage at each end, yellowish, with a nucleus in each cell, 7-8x15-2 μ .

On dead branches of cultivated roses. Bethlehem, Pa. May, 1883. E. A. Rau.

SPHÆRIA (DIDYMOSPHERIA) CUPULA.—Perithecia scattered, innate, covered, except the papilliform ostiolum, by the blackened epidermis, convex-hemispheric when fresh, collapsed when dry; asci 75x7 μ ; sporidia elliptical, brown, uniseptate, uniseriate, 9.5-11.5x4.5-5 μ .

Sphæria diplospora, Cke., has sporidia 13-16x5-7 μ , and perithecia not collapsing.

On dry oak-leaves still hanging on the limbs. Newfield, N. J. May, 1882. Found also on *Phytolacca* and *Desmodium*.

SPHÆRIA (THYRIDIDIUM) ANTIQUA.—Perithecia mostly solitary, globose, .25-.33^{mm} in diameter, buried in the substance of the bark, sometimes two or three together, their thick walls united and covered by the fibres of the bark, which is blackened above them and raised into little tuberculiform pustules; ostiola papilliform, at length perforated; asci cylindrical, 75-80x10 μ ; paraphyses filiform, abundant; sporidia uniseriate, oblong-elliptical, at length 3-septate and submuriform, 17-19x7 μ , brown.

On the inner surface of loosely hanging bark of grape-vines. Newfield, N. J. May, 1883.

Some New Texan Plants.

By S. B. BUCKLEY.

ZANTHOXYLUM TEXANUM.—Unarmed, leaves trifoliate, leaflets ovate, obtuse, repandly crenate, subrevolute, smooth on both sides, punctate, petioles 4"-6" long, lateral leaflets serrate, petiole terminal one 3"-6" long; racemes terminal, compound, pedicels short, with minute, acute, bracts and bractlets; divisions of calyx broadly ovate, acute, ovules 1-2, seeds not seen.

A large shrub 4-6 feet high, thickly branched; younger branches greyish brown, much punctated. The branches when broken have the aromatic odor peculiar to many species of the genus.

Differs from *Z. ternatum* of the West Indies in its terminal racemes and crenate leaflets. Near Corpus Christi, Texas.

BUMELIA TEXANA.—Leaves ovate or subcuneate, smooth on both sides, and of the same pale green color, 1'-1½' long and about ½' wide, petioles longer than the pedicels, being about 4" long, smooth; calyx broadly ovate, subobtusely; corolla yellowish white, but little

longer than the calyx; petioles and midrib of the under sides of some of the leaves showing a slight pubescence under the microscope; fruit ovoid-ovate or elliptic in outline, 3"-4" long and about 3" broad.

A shrub or small tree. Smaller branches with dark reddish brown bark, rigid and sub-spinose, the leafy and fruit-bearing spines 1'-3' long.

Mountains near the lower crossing of the Pecos River on the road from Fort Stockton to old Fort Lancaster and the head of Devil's River.

BUMELIA MONTICOLA.—Very spinose; leaves smooth on both sides, a little paler beneath, oblong-ovate, cuneate at the base, petiolate, 1'-1½' long and ¼'-½' wide, their under surface reticulately veined; petioles 3"-4" long, about equal in length to the pedicels; calyx broad ovate, acute or sub-acute, smooth; fruit globose, the longitudinal diameter a little the greater, being about 3" long; spines 1'-2' long, often bearing leaves and fruit; smaller branches smooth, greyish brown, forming obtuse angles opposite their junction with the spines, with generally a warty protuberance at the base of each spine; flowers not seen.

A straggling shrub 3-9 feet high, with smooth reddish brown bark. Mountains of El Paso County, N. W. Texas.

Quercus Durandii, var. *SAN SABIA*.—This is a small oak seldom more than ten feet high, generally only from four to six feet, growing in dense thickets on some of the limestone hills of San Saba and its adjacent counties, Texas.

It has small, obtusely lobed leaves, which, when old, are nearly of the same color and smooth on both sides; when young, glaucous and sub-pubescent beneath; acorn oblong-ovoid, cup shallow, one-third the length of the acorn. Bark of trunk and branches light grey and scaly. Called "shin oak." Bark, acorns and cups very much like those of *Q. Durandii*, and so much so that it can only be considered as a well marked variety of it.

It has been called by Engelmann a variety of *Q. undulata*, and is placed thereunder in Prof. Sargent's Synopsis of the Trees of North America, and, in the same work, on the same authority, *Q. Durandii* is called a variety of *Q. stellata*; but these authorities now admit *Q. Durandii* to be a good species.

QUERCUS VASEYANA.—Leaves apparently deciduous, with shallow, repand, acutely toothed lobes and sub-mucronate teeth, smooth on both sides, or slightly downy and paler beneath, mostly cuneate at the base, rarely rounded, lanceolate or lance-ovate, petiolate, 1'-2' long and ½'-1' wide; petioles 1'-2" long; acorns oblong-ovoid, smooth, shining and of a pale chestnut color, 6"-7" long and about 4" wide; cups sessile, their greyish-brown scales tumid, triangular ovate, acute.

A shrub or small tree of the class of black oaks. On the mesas of the cretaceous limestone mountains near the lower crossing of the Pecos, and also in the valley of the Devil's River of Western Texas.

Named in honor of Dr. Vasey, botanist of the Agricultural Department at Washington, D. C.

Potamogetons in Western New York.—While spending a few days of the summer of 1882 in Western New York, I examined some of the lakes and streams of Wyoming, Genesee and Livingston Counties for species of *Potamogeton*. The results are given below, with the reservation, however, that they do not profess to be exhaustive, since time enough was not at my command at every locality to attain this end. The examination was carried far enough to see that the waters of that region still need to be searched more carefully than has yet been done to obtain a complete knowledge of the geographical distribution of these difficult and somewhat neglected plants.

The localities chiefly noticed were Silver Lake and its outlet at Perry, Wyoming County, Hemlock and Conesus Lakes, Livingston County, and Oatka Creek and several smaller streams of Genesee and Wyoming Counties. Fourteen species were found with considerable variation on the part of some, and are as follows:

P. natans, L., Silver Lake and Oatka Creek.

P. Claytonii, Tuckerman. Same localities, and Hemlock Lake and its outlet.

P. spirillus, Tuckerman. Hemlock and Conesus Lakes.

P. lonchites, Tuckerman. Hemlock and Conesus Lakes.

P. amplifolius, Tuckerman. Oatka Creek and the three lakes.

P. graminus, L. Some forms belonging to the variety *heterophyllus*, Fries, and others that are difficult to bring under the head of any varieties given in the books, the species being so polymorphic. Conesus Lake and Oatka Creek.

P. lucens, L. Oatka Creek.

P. perfoliatus, L. Either the variety *lanceolatus*, Robbins, or inclining to this, though some forms have very short leaves. The three lakes and Oatka Creek.

P. zosteræfolius, Schumacher (*P. compressus*, L. [ex Fries.]) Silver and Hemlock Lakes.

P. pauciflorus, Pursh. Silver Lake and Oatka Creek; also abundant in brooks and pools.

P. lateralis, Morong. (*Bot. Gaz.*, May, 1880.) Hemlock Lake.

P. pusillus, L. Principally the variety *vulgaris*, Fries. Silver, Hemlock and Conesus Lakes.

P. pectinatus, L. Silver, Hemlock and Conesus Lakes.

P. marinus, L. Hemlock and Conesus Lakes.

NOTES.—*P. Claytonii*. Those taken from Oatka Creek, near the village of Wyoming, had remarkably long floating leaves like some I had found at Ludington, Mich. They were in some cases 4–4½ inches long, and the petioles of these and of specimens from Silver Lake were usually from 1–2 inches long.

P. amplifolius was one of the most common species, being found quite generally in all mill-ponds and lakes, and streams whose depth was sufficient for its growth.

P. pauciflorus. This was the only species seen in brooks and in Oatka Creek, between Warsaw and Wyoming, with one exception (*P. Claytonii*). It commonly occurred in nearly all pools and brooks where the water, supplied by springs, or oozing out from

neighboring hills, did not fail on account of the summer heat. All the forms were of the coarsed-leaved kinds, the leaves frequently having a length of 2-3½ inches, and a corresponding width, being 3-5-nerved. The fruit, in capitate clusters, and with the keel more or less crested and notched, was very abundant. In these characters it approaches *P. Niagarensis*, Tuckerman; but, according to Mr. Morong, to whom some of the most marked specimens were submitted for comparison with type specimens in Robbins's herbarium, they are not quite identical. This great variability of leaves, and to some extent of fruit, both of which were carefully studied in specimens gathered in many localities, and under diverse conditions of growth, seems to lead conclusively to the opinion that no well marked line of separation can be drawn between *P. Niagarensis*, Tuckerman, and *P. pauciflorus*, Pursh; and that the former should be regarded as a variety of the latter. The same is true if based on a comparison of specimens collected in several quite widely separated localities in the West and North-west.

P. pusillus. Specimens of this would have to be classed with the variety *vulgaris*, Fries, sometimes approaching var. *major*, Fries, but more often var. *tenuissimus*, Mertens & Koch. In Silver Lake three forms were noticed, a common one with stems often 4½ feet long, but with fruit immature; a second with stems also long, of a reddish or pink color, and spikes of fruit emerged; a third with fruit larger and longer than usual, somewhat oblong, with a rather long, recurved style, the sides of the fruit impressed; spikes interrupted; stems 3-5 feet long.

P. marinus. This was very abundant in Hemlock Lake, in water 1½-3 feet deep, frequently in beds completely covering the bottom. The stems were usually long for the species, being about one foot in length, and the fruit copious. It was detected nowhere in the shallowest water nearest the shore, this ground being occupied almost invariably by *P. spirillus*, equally common but not in so dense beds. That found in Conesus Lake was not so tall, nor very common, as far as examination was made.

It may be of interest to state in connection with this as an evidence of the purity of the water of Hemlock Lake, from which the city of Rochester takes its water supply, that *Potamogetons* gathered there were almost wholly free from the earthy sediment which usually clings to these plants and is very troublesome to the collector, marring the looks and cleanness of his specimens. Chemical analysis has shown that the water of this lake ranks with the purest in the State. Species of *Potamogeton*, found in the neighboring Conesus Lake, whose water looks equally pure to the eye, were, however, quite thickly coated with an earthy deposit.

The time of these examinations was between July 22d and Aug. 9th, and the greater part of the species found showed some mature fruit, generally essential for complete identification.

Englewood, Ill.

E. J. HILL.

Pinus Banksiana.—In the July number of the BULLETIN (p. 82), Mr. N. L. Britton calls attention to the fact that our botanical writers

have commonly understated the size of Banks's Pine (*Pinus Banksiana*, Lambert), Gray describing it as "a straggling shrub or low tree," and other authors giving its maximum height at from twenty to forty feet. Mr. Britton then states that he has found trees, in the vicinity of Marquette on Lake Superior, that measured seventy feet in height; but he overlooks the detailed observations of Mr. Bell, who tells us that on the southern branches of Albany River, south-west of Hudson's Bay, he saw "large groves of these trees about seventy feet in height, and two feet in diameter at butt, with straight trunks nearly free from branches for the first twenty or thirty feet."

I have myself seen Banks's pine growing in abundance at various places along the lower River and Gulf of St. Lawrence, and at Newfoundland; and have found many trees at Godbout and Seven Islands that were upwards of fifty feet in height, and some that exceeded sixty feet. In the Province of Quebec it is largely used as a fire-wood, and along the north shore of the river it has become an article of commerce of no inconsiderable value, thousands of cords being shipped annually to Quebec. It is here called "cypress"!

In our manuals the species is commonly, though very improperly termed the "northern scrub pine." Its habitat is in the far north, where it attains its maximum development, constituting one of the larger forest trees. Only beyond the limits of its proper range does it occur as a "straggling shrub," or merit the appellation of "scrubby."

Mr. J. A. Allen, in treating of the correlation of size with geographical distribution in mammals, has tersely formulated the following law, which is as strikingly applicable in the present case as in any member of the group for which it was particularly framed: "*The maximum physical development of the individual is attained where the conditions of environment are most favorable to the life of the species.*" Species being primarily limited in their distribution by climatic conditions, their representatives living at or near either of their respective latitudinal boundaries are more or less unfavorably affected by the influences that finally limit the range of the species."

Locust Grove, N. Y.

C. HART MERRIAM.

Lonicera grata.—Does any New York or New Jersey botanist know aught of the station for this plant, "in the cedar swamps of New Durham, about three miles from Hoboken, New Jersey," cited by Torrey in his *Flora of the Northern and Middle States*, or, if the plant and the swamp are now extinct, is any other locality known? There is no specimen from New Jersey or New York in the Torrey Herbarium. This herbarium has a specimen from Dr. Darlington, and his stations, as given in the second edition of the *Flora Cestricea* (it is not in the first edition), are "on Ridley Creek, by Mr. George W. Hall, in 1831, also along the Brandywine, above the Forks, in 1835, by John Rutter." Now there is nothing in the character, nor in Darlington's specimens, to distinguish the species from the *L. Caprifolium* excepting that the leaves are perhaps more glaucous beneath and that the flowers are said to "have almost too strong an odor to be agreeable." I am not aware that this has ever been said of the

European honeysuckle. Dr. Hale's Louisiana specimen, in Herb. Torr., I must suppose to be the European species. No other specimens purporting to be indigenous are known to me. Is there really an indigenous species of this sort? As Darlington cites *Lonicera Virginiana*, Marshall, Arbust., as a synonym of *L. grata*, and as Marshall, who lived in Darlington's district, assigns no particular habitat for his species, one may suppose that he had in view a wild species of his own region. But if so he would hardly have named it *L. Virginiana*; and his description answers rather to *L. sempervirens*, the flowers "having long scarlet tubes with short borders." We get no more satisfaction by referring to the original sources of the species. It was founded, in the Hortus Kewensis, on *Periclymenum Americanum* of Miller's Dictionary. Miller merely says it is from America. Pursh would seem to have known all about it. He says: "On the mountains, rambling among rocks, in shady, moist situations, New York to Carolina; rare." But in such matters Pursh is not to be trusted. Can any American botanist throw further light upon the matter?

ASA GRAY.

Magnolia glauca, L., on Long Island.—This tree, reported in the N. Y. State Flora as occurring on Long Island, and which has hitherto eluded the search of recent explorers, including the authors of the Catalogue of the Plants of Suffolk Co., has been found by Mr. Robert W. Newbery, of this city, growing spontaneously on both sides of the L. I. Railroad culvert at Tuttle's Pond, a short distance east of Speonk Station, Suffolk Co.

Brooklyn, N. Y.

W. H. RUDKIN.

Botanical Notes.

Diospyros Kaki.—According to J. Ishikana, in a paper on the materials containing tannin used in Japan, a remarkable liquid, called "kaki-no-shibu," prepared from the astringent fruits of the persimmon (*Diospyros Kaki*), is used for giving strength and durability to paper, which is applied to many more uses in Japan than in other countries. This property appears to be due to the deposit from the film of liquid, with which the paper is covered, possessing somewhat of the character of lacquer, while the tannin acts as an antiseptic. The film formed by this liquid on materials coated with or immersed in it is almost insoluble in water or alcohol and is not perceptibly attacked by boiling with dilute sulphuric acid. The kaki-no-shibu is prepared from the fruits gathered early in the summer and beaten in stone mortars. The mass, transferred to wooden tubs, is covered with water for half a day, and then filtered through a straw bag. The liquid so prepared is a milky fluid of a light or dark grey color and evidently holds minute particles of solid matter in suspension.

The Development of Chlorophyll.—In recent works published by Messrs. Schimper and A. Meyer on the development of chlorophyll and color-bearing granules of plants, it is stated that instead of these bodies being formed free in the protoplasm of the cell, as hitherto

supposed, they arise from distinct structures or "plastidia" present in the young cell from its earliest existence, and that any pigment, starch grains, etc., found in connection with the structure named arise by later changes produced by continuous growth and division of the few minute plastidia found in the young cells. Those which are deeply seated and not as yet colored are called by Schimper "leucoplastidia"; those which are nearer the light and in which a green coloring matter is developed, "chloroplastidia;" and those which in dividing give rise to needle- or spindle-shaped bodies or triangular ones with sharply pointed corners, and pass through various shades from green to carmine-red, he calls "chromoplastidia." These forms appear to be due to the crystallization of certain of the proteid contents of the plastidia. All the plastidia of the stem and leaves appear to rise by division of the plastidia in the *punctum vegetationis* of the young stem, and those of the root from the division and differentiation of those of the *punctum vegetationis* of the radicle. As they are found at a very early age of the embryo, even when only eight cells old, as in *Linum Austriacum*, Schimper thinks it probable that they arise from primitive plastidia in the oosphere. Starch grains may arise from the leucoplastidia, also, at a very early stage, as they may be observed in the oosphere. The Characeæ would seem to be the earliest plants in which all three forms of these bodies occur, the apical cells containing leucoplastidia, and the antheridia owing their color to chromoplastidia.

Botanical Literature.

Sylloge Fungorum omnium hucusque cognitorum. By P. A. Saccardo.

The second volume of this work is now issued. It contains 813 pages, besides 69 pages of Addenda, carrying the number of species up to 6,180, which is supposed to include all the Pyrenomycetes thus far known. At the end this volume there is an alphabetical index of all the specific names in the two volumes; the generic name being added in parenthesis after each specific name.

Whatever may be thought of the many new genera into which the old genus *Sphaeria* is here divided, there can be but one opinion as to the practical value of the work, which should be in the hands of every thorough student of mycology. Vol. iii., describing the "imperfect" fungi, will appear next year.—J. B. E.

Contributions to American Botany. XI. By Sereno Watson. 8vo, pp. 100. (From the *Proceedings* of Amer. Acad. of Arts and Sciences. Vol. xviii).

This instalment of Mr. Watson's Contributions to American Botany, issued on the 15th inst., contains: (1) List of Plants from South-western Texas and Northern Mexico, collected chiefly by Dr. E. Palmer in 1879-80; Gamopetatae to Acotyledones; and (2) Descriptions of some new Western species (*Greggia linearifolia*, *Sagina crassicaulis*, *Montia Howellii*, *Astragalus Matthewsii*, *A. Wingatanus*, *A. hypoxylus*, *Spiraea occidentalis*, *Ribes ambiguum*, *Sedum radiatum*, *Gayophytum pumilum*, *Eryngium discolor*, *Suaeda minutiflora*, *Eriogonum Shockleyi*, *E. Havardi*, *Euphorbia Plummeræ*, *Microstylis purpurea*, *M. corymbosa*, *Allium Plummeræ* and *Bouteloua Texana*.)

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.] New York, September, 1883, [No. 9.

New Species of Fungi.

By J. B. ELLIS and BENJAMIN M. EVERHART.

HAPLARIA CHLORINA.—Forming thin, greenish-yellow patches, .5-1^{cm.} in diameter, hyphæ erect cæspitose, 3-4 together, brownish under the microscope, slender, 4-5-septate, tips minutely roughened and bearing numerous subglobose or slightly elliptical, 1.5-2x1-1.5 μ hyaline conidia.

On rotten wood of *Magnolia*, Newfield, N. J. July, 1883.

VIRGARIA OLIVACEA.—Hyphæ erect, simple, olive-brown, faintly septate below, slightly enlarged and paler, with a wavy outline, above, 125x2.5 μ ; conidia solitary, obovate, brown, terminal, 4x3.5 μ . Forming an olive-brown, velvet-like coating extending for 1-3^{cm.} along the surface of a dry dead oak-limb.

Newfield, N. J., Aug. 1883.

Differs from *V. globigera*, S. & E., in its olivaceous color and smaller conidia, without any granular contents.

SPICARIA FUMOSA.—Hyphæ erect, solitary, smoky-brown, obscurely septate and mostly swollen at intervals, attached by a small, disk-like expansion at base, 70-80x3 μ , subverticillately divided above into 2-5, short (7-8 μ) hyaline branches, swollen at base and bearing at their tips a series of oblong, hyaline, continuous, 2.5-.75 μ conidia, placed end to end so as to form a continuous chain or necklace, 20-40 μ long and appearing, when examined in the dry state, as a faintly septate continuation of the terminal branches of the hyphæ, but quickly separating into its component conidia on the application of water.

On the spines of old chestnut-burs. Fairmount Park, Philadelphia, Pa. July, 1883. Hugo Bilgram.

SEPTORIA FLAGELLARIS.—On orbicular, reddish-brown spots (1-2^{mm.}), definitely limited and often concentrically wrinkled, sometimes whitening out on the upper surface, apparently by the peeling off of the cuticle; perithecia either solitary in the centre of the spots or 2-3 together, sublenticular, 80-120 μ in diameter; spores 35-114x1.5 μ , nucleate, or oftener 4-8-septate, broader at one end and gradually attenuated to the other.

On living leaves of *Calystegia Sepium*. Newfield, N. J., Aug. 1883.

S. Convolvuli, Desm., has spores only 35-50 μ long, and larger perithecia on less definitely limited spots. *S. Sepium*, Desm., also differs in its spores being twice as broad, and in the different appearance of the spots.

PHYLLOSTICTA SPHÆROPSOIDEA.—Spots reddish brown, with a light yellow border, varying in size and shape, 1-2^{cm.}, or, by confluence, larger; perithecia scattered, punctiform, immersed, opening above, but also projecting on the lower surface of the leaf, though

covered by the cuticle; spores globose or short elliptical, hyaline, filled with small nuclei, or with one or two large nuclei and many small ones, $12-15.5 \times 8-10\mu$, on stout basidia like a *Sphaeropsis*.

On living leaves of *Aesculus Hippocastani*. Vineland, N. J., August, 1883. Dr. E. C. Bidwell.

This appears to be quite injurious, many of the trees appearing at a little distance as if they had had their leaves scorched by fire.

PEZIZA (SARCOSYPHA) CHLAMYDOSPORA.—Cæspitose, 1-2^{cm} across, sessile, dark brown, minutely granular outside, margin obsoletely toothed, involute when dry; asci cylindrical, $170-200 \times 10-11\mu$; paraphyses linear, stout, scarcely thickened above; sporidia uniseriate, elliptical, with a rough episporium, 1-2-nucleate, $11-12 \times 7\mu$.

On the ground, West Chester, Pa., June, 1882-3,

Everhart, Haines, Jefferies and Gray.

Allied to *P. badia*, Pers., but differing in its rougher sporidia and the very large cells of the intermediate layer of the cups.

HELOTIUM SULFURELLUM.—Light lemon-colored or very nearly sulphur-colored with a slight tinge of green, farinose; stem firm, brownish at the base, gradually enlarged above, 3-7^{mm} high; disk darker, pale cinnamon-brown when dry, concave or nearly plane, sometimes distinctly umbilicate, 2-4^{mm} broad, margin subacute and even; asci cylindrical, $75 \times 7-8\mu$; paraphyses filiform, slightly enlarged and yellowish above; sporidia uniseriate, partly overlapping, navicular, elliptical, 2-nucleate, nearly hyaline or with a faint tinge of yellow, $10-12 \times 3.5-5\mu$.

On fallen petioles of *Fraxinus Americana*.

West Chester, Pa., August, 1883. Everhart and Haines.

Helotium Limonium, C. & P., and *H. gracile*, C. & P., which this somewhat resembles, have quite different sporidia.

DIAPORTHE ASCLEPIADIS.—Stroma forming black patches on the surface of the stem, .5^{cm} long, or, by confluence, much longer, limited within by a deeply penetrating, black, circumscribing line; perithecia scattered globose (.25^{mm}), buried in the substance of the stem, but not deeply; ostiola rather stout, cylindrical, subobtuse, .25-.33^{mm} long; asci (spore-bearing part) $35-40 \times 9\mu$; sporidia biseriata, elliptical, constricted in the middle, 3-4-nucleate, subobtuse, $10-12 \times 3-4\mu$.

On dead stems of *Asclepias tuberosa*. Newfield, N. J.

GNOMONIA SASSAFRAS.—Perithecia erumpent, hemispherical, about 200μ in diameter, scattered over the lower surface of the leaves and along the midrib; ostiola filiform, $200-250\mu$ long, of fibrous texture, subhyaline above, mostly a little bent; asci lanceolate, curved; paraphyses none; sporidia spiculiform or filiform, with a faint yellowish tinge, indistinctly multinucleate, $35-40 \times 7.5\mu$.

On fallen leaves of *Sassafras officinale*.

Fairfield Co., Ohio, June, 1883. W. A. Kellermann.

SPHÆRELLA SASSAFRAS.—Perithecia minute, semi-immersed, scattered over the lower surface of the leaf, or collected in groups, but not on any discolored spots; asci $35 \times 5\mu$; sporidia biseriata, oblong-elliptical, uniseptate, $4 \times 1.75\mu$, hyaline.

With the preceding.

On the Fruit of *Eustichium Norvegicum*, Br. Eu.

By ELIZABETH G. KNIGHT.

The rare moss, *Eustichium Norvegicum*, has long been known to bryologists, but, up to the present time, no description of its fruit has been published. It has been my good fortune to find the plant in fructification, and a description of the fruit, illustrated by figures showing the details of its structure, is here appended.

The moss was found in great abundance on the Potsdam sandstone in the dells of the Wisconsin River, near Kilbourn City, Wis., on July 8th of the present year, and, after careful search, seventeen fertile specimens were obtained. It grew on moist, vertical faces of rock forming large patches.

Description of the Fruit.—Capsule terminal, pendent, pyriform, 1^{mm}. long and about half as broad when moist, noticeable by its yellow color, supported on a curved pedicel which slightly exceeds the length of the capsule; teeth none in the specimens collected, their place being occupied by a thin, transparent membrane; columella a straight rod persistently attached to the operculum; operculum long-rostrate, conic when moist, flattening in drying by the contraction of the elastic annulus, leaving the oblique rostrum prominently projecting, itself parting from the expanding mouth of the capsule and carrying with it shreds of the ruptured membrane; calyptra cuculliform, .75^{mm}. in length, tipped with a long whip-like awn, which equals or exceeds in length the rest of the calyptra.

The other characters agree with the description given in Sullivant's Mosses in Gray's Manual (4th ed., 1863, p. 629), as follows:

"Stems frond-like, flat, mostly simple (about 1' long and 1" broad), rooting only at the bulb-like base; leaves 2-ranked, complicate, closely imbricating, erect; those on the middle of the stem elongated-oblong, obliquely truncate, shortly acuminate, increasing in size as they ascend, the perichætil leaves attenuated into a long and linear, flexuous, pellucid, flat, equitant and slightly serrulate point, longer than the lamina; areolation above sub-rotund, below oblong, that of the point of the perichætil leaves linear; costa percurrent, its upper part narrowly winged; diœcious; flowers of both kinds terminal."

In the Memoirs of the American Academy (n. ser., p. 57. t. i.) Sullivant says: "The genus of our moss must remain uncertain until the discovery of its fruit, which we may now expect," etc. If further examination of more mature specimens proves the lack of teeth, then the South American *Eustichia longirostris*, Brid., should be transferred to another genus. For description of *E. longirostris*, see G. Mitten, *Jour. Linn. Soc.*, xii., p. 603 and Brid. Bry. Univ. For descriptions of *Eustichium Norvegicum*, see Br. Eu., fas. xlii.; Brid., Vol. ii., p. 674; and C. Müller, Syn. Musc. Frond., i., p. 42.

EXPLANATION OF THE FIGURES.—Fig. 1. Calyptra magnified 50 diameters. Fig. 2. The fresh capsule, with conical operculum, magnified 50 diameters. Fig. 3. The same dried, with detached and contracted operculum. Fig. 4. Calyptra and columella seen through a natural rupture in the wall of the capsule. Fig. 5. Another view of the same. Fig. 6. An entire plant magnified 5 diameters.

Fig. 1

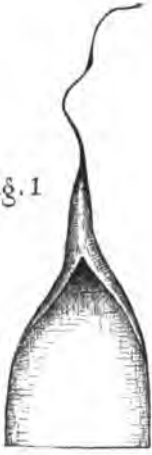


Fig. 2

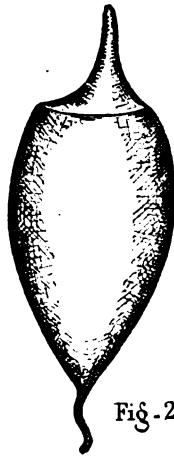


Fig. 3

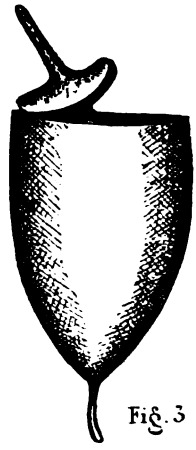


Fig. 6

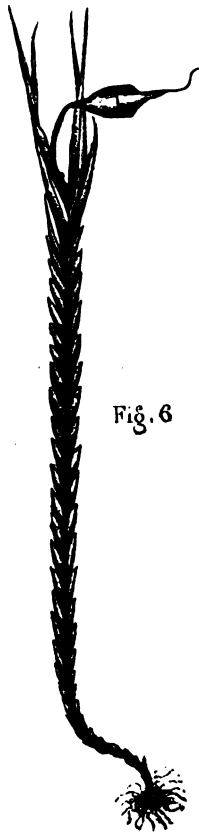


Fig. 4



Fig. 5



A New Eleocharis.

By CHARLES WRIGHT.

ELEOCHARIS DIANDRA.—Culms nearly terete (8'-10' high) from tufted, fibrous roots, rather slender; spike ovoid, very obtuse (2"-4" long); scales numerous (80-120) ovate, rounded at the tip, one-third longer than the achenium, imbricated in many rows; stamens two; achenium cuneate-obovate, pale stramineous becoming castaneous, shining, scarcely half a line long; bristles few and short, or mostly wanting; tubercle depressed, transversely oblong, the ends rounded and slightly elevated, the top shortly apiculate; style usually bifid.

On high sand-bars of the Connecticut River, between Hartford and Wethersfield, growing in company with *E. obtusa*, which it closely resembles in appearance. A tabular statement of the differences is appended.

	<i>Eleocharis obtusa</i> , Shultes.	<i>Eleocharis diandra</i> , n. sp.
TUFTS mostly	larger, annual.	smaller, annual.
SPIKE	very blunt.	bluntish or acutish.
SCALES	rounded at top; one-third longer than the achenium.	narrowed towards the blunt apex; twice as long as the achenium.
STAMENS	three.	two.
BRISTLES	exceeding the tubercle.	few and short or mostly 0.
ACHENIUM	larger, tapering evenly to the base.	smaller, tapering more abruptly into a narrower base.
TUBERCLE	crest-like and thin, curved on the lower edge, which rests its whole length on the achenium, and is almost as broad, the two other sides forming about a right angle.	transversely oblong, its end rounded and raised above the achenium, and little more than half as broad, shortly apiculate.
STYLE	3-cleft, rarely bifid.	bifid, rarely 3-cleft.

The main differences are: first, *two* stamens, for which in our floras there is no generic allowance; secondly, the usually bifid style; thirdly, the tubercle wanting the *cusps* which run down the top of the achenium of *E. obtusa*; and, fourthly, the few small bristles, or mostly none at all.

New or Little-known Ferns of the United States, No. 14.

By D. C. EATON.

53. *Phegopteris reptans*, (*Polypodium reptans*, Swz.; *Aspidium reptans*, Mett.),—Rootstock short, creeping; stalks clustered, gray-stramineous, slender, naked, a few inches to a foot long; frond as long as the stalk, membranaceous, softly hairy with branched or stellate hairs, oblong lanceolate, pinnate with nearly or quite sessile oblong or sometimes rounded obtuse crenately pinnatifid pinnæ, the apex pinnatifid and often elongated and rooting; veins pinnate, simple, the basal veinlets often anastomosing; sori rather small, seated on the middle of the veinlets, naked or with a minute rudiment of an indusium.

Pendent on the face of cavernous calcareous rocks in a hammock on the left bank of the Withlacoochee River, 15 miles N. E. from Brooksville, Hernando Co., Florida; Captain John Donnell Smith, March 22, 1883.

This is another common West Indian fern, now known to inhabit Florida. Mettenius, who referred it to *Aspidium* on account of a barely perceptible rudiment of an indusium, recognized four varieties: *cordata*, *hastæfolia*, *radicans* and *asplenioides*. Captain Smith's specimens represent the first and third of these forms, which are often found on the same plant, and cannot properly be separated even as varieties.

54. *Adiantum tenerum*, Swz.—Fine specimens from the same station, a new locality.

55. *Asplenium firmum*, Kze.—The same station.

56. *Asplenium rhizophyllum*, Kze.—The same station. These fronds are over a foot long, and have much coarser segments than the plants heretofore separated under the name of *A. myriophyllum*. The intermediate forms now sent in by several collectors show that the latter can not be kept distinct, and that, with Mr. Davenport (Catalogue, Supplement, March, 1883, p. 46), we must be content with the older name for both.

57. *Aspidium trifoliatum*, Swz.—The same station. Several other well known Florida ferns are in Captain Smith's collection of the present year, and are represented by fine specimens, as usual.

Plants New to the Connecticut Flora.—Mr. Charles Wright, the veteran botanist, has found the following plants additional to the Berzelius catalogue :

Ludwigia polycarpa, Short & Peter.—Abundant in wet places in Hartford.

Crantzia lineata, Nutt.—Salt marshes at Fenwick, near the railway station.

Alopecurus geniculatus, L.—Common in wet places about Wethersfield.

Mrs. Emily J. Leonard, of Meriden, has noticed a few newly introduced plants :

Sarothamnus scoparius, Wimmer.—Near Meriden, some ten square rods of it by the roadside.

Phacelia Purshii, Buckley.—At Short Beach, Branford.

Phacelia viscida, Torrey.—Spontaneous with *Impatiens fulva* and other brook-plants, in a spot on which muck had been deposited.

To these I add :

Glycyrrhiza lepidota, Nutt.—Established and spreading on a roadside in New Haven.

Cycloloma platyphyllum, Moquin.—Hamden, Miss Edwards.

Chatomorpha melagonium, Kützinger.—On rocks at low water mark on Black Point, East Lyme ; an alga not before noticed south of Cape Cod.

DANIEL C. EATON.

Contributions toward a List of the State and Local Floras of the United States

V. THE WESTERN STATES.

Synopsis of the Flora of the Western States. By J. L. Riddell, M.D. (B.)

8vo, pamphlet, pp. 116. Cincinnati, 1835; also in *Western Journ. Med. and Phys. Sci.*, January and April, 1835.

Flora of the Lake Superior region. By W. D. Whitney. (B.)

In Foster and Whitney's Report, Part ii., Washington, 1851.

Notice of the Plants collected by Prof. D. B. Douglass, of West Point, in the expedition under Governor Cass during the summer of 1820, around the great lakes and upper waters of the Mississippi. By John Torrey, M.D. (C.)

In Sillimans Journal, i series, Vol. iv., 1822.

Catalogue of Plants collected by Mr. Charles Geyer, under the direction of I. N. Nicollet, during the exploration of the region between the Mississippi and the Missouri Rivers. By John Torrey, M.D. (C.)

Appendix B, Senate Doc. 237, 26th Congress, Washington, 1843.

(The list embraces plants collected in portions of Minnesota, Iowa, Nebraska and Dakota.)

Plants collected during the exploration of the Upper Missouri by F. V. Hayden. By George Englemann, M.D. (B.)

In *Trans. Amer. Philos. Soc.*, Vol. xii., Philadelphia, 1863.

(The plants enumerated are mostly from Nebraska, with some from Iowa, Dakota and Montana.)

Notice concernig the late Mr. Drummond's Journeys and his collections made chiefly in the Southern and Western parts of the United States. By W. J. Hooker. (D.)

In *Comp. to Bot. Mag.*, i., p. 39, et seq.

Systematic Catalogue of the Plants of Wisconsin and Minnesota, made in connexion with the Geological Survey of the North-west, during the season of 1848. By C. C. Parry, M.D. (C.)

In *Rep. Geol. Surv. Wisconsin, Iowa and Minnesota* by David Dale Owen, p. 606, Philadelphia, 1852.

(Includes localities for some Iowa Plants.)

The Grasses of Wisconsin and the adjacent States of Iowa, Illinois, Indiana, Ohio and Michigan, the Territory of Minnesota and the regions about Lake Superior (D.) By I. A. Lapham.

In some state publication of Wisconsin, the title of which we have been unable to ascertain.

OHIO.

Supplementary Catalogue of Ohio plants, embracing the species discovered within the State in 1835. By J. L. Riddell, M.D. (D.)

In *Western Journ. Med. and Phys. Sci.* Vol. ix. 1836.

List of the Medicinal Plants of Ohio (with brief accounts of their properties.) By J. M. Bigelow.

8vo, pp. 47. Columbus, 1849.

List of Grasses found in Ohio. By J. H. Klippart. (B.)

In *Ohio Agricultural Report* for 1859.

- List of the native Forest Trees of Ohio. By J. H. Klippart. (A.)
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- Catalogue of the flowering Plants and Ferns of Ohio. By J. S. Newberry, M.D. (B.)
8vo, pamphlet, pp. 41. Columbus, 1860.
- List of Forest Trees found growing indigenously in Ohio. By John Hussey. (B.)
In Ohio Agricultural Report for 1872, pp. 32-40.
- Catalogue of the Plants of Ohio, including flowering Plants, Ferns, Mosses and Liverworts. By H. C. Beardslee, M.D. (B.)
8vo, pamphlet, pp. 19. Painesville, 1874; also in Ohio Agricultural Report for 1877.
- List of Hepaticæ growing in Ohio. By H. C. Beardslee. (A.)
In Botanical Gazette, Vol. i., p. 22. 1876.
- Woody Plants of Ohio. By John A. Warder, M.D., assisted by D. L. James and Jos. F. James. (D.) Presented at the meeting of the Agricultural Convention of Ohio in Columbus, January, 1882.
8vo, pamphlet, pp. 40.
- Darke County.*
Common forest Trees noticed in Darke County. By A. C. Lindemuth. (A.)
In Rep. Geol. Surv. Ohio, Vol. iii., p. 511. 1878.
- Defiance County.*
List of Trees of Defiance County. By N. H. Winchell. (A.)
In Rep. Geol. Surv. Ohio, Vol. ii., p. 424. 1874.
- Delaware County.*
Trees, Shrubs and woody Vines found growing in Delaware County.
By Rev. J. H. Creighton. (A.)
In Rep. Geol. Surv. Ohio, Vol. ii., p. 274. 1874.
- Fairfield County.*
Florula Lancastriensis, or a Catalogue comprising nearly all the flowering and filicoid Plants growing naturally within the limits of Fairfield County, with notes of such as are of medicinal value.
By John M. Bigelow, M.D. (A.)
In Proc. Med. Convent. of Ohio at Columbus, May, 1841. Columbus, 1841.
- Florula Lancastriensis; a Catalogue of the Plants of Fairfield County. By John M. Bigelow and Asa Hor. (A.)
8vo, pp. 22, Lancaster, 1841.
- Franklin County.*
Catalogue of the Plants growing spontaneously in Franklin County, Central Ohio. By John L. Riddell, M.D. (A.)
In Western Med. Gaz., Vol. ii., 1834.
- Catalogue of the Plants, native or naturalized, in the vicinity of Columbus. By W. S. Sullivant. (A.)
8vo, pamphlet, pp. 63. Culumbus, 1840.
- Hamilton County.*
Catalogue of the Plants of Cincinnati. By Thomas G. Lea. (C.)
8vo, pp. 77. Philadelphia, 1849.
- Catalogue of the flowering Plants and Ferns observed in the vicinity of Cincinnati. By Joseph Clark. (A.)
16mo, pamphlet, pp. 40. Cincinnati, 1852.

Catalogue of the flowering Plants, Ferns and Fungi growing in the vicinity of Cincinnati. By Joseph F. James. (A.)

In Jour. Cincin. Soc. Nat. Hist., Vol. ii., 1878. (Additions and corrections by Davis L. James. (B.) Vol. iv., 1881.

Henry County.

List of Trees characteristic of Henry County. By N. H. Winchell. (A.)

In Rep. Geol. Surv. Ohio, Vol. ii., p. 416. 1874.

Miami, Montgomery, Butler, Warren and Hamilton Counties.

Flora of the Miami Valley. By A. P. Morgan. (A.)

Published by the Literary Union, Dayton, Ohio.

16mo, pamphlet, pp. 68. Dayton, 1878.

(List includes Phænogams, Ferns, Mosses, Liverworts, Lichens and Fungi.)

W. R. G.

N. L. B.

Notes on a Botanical Excursion to Sam's Point, Ulster Co., N. Y.

—Sam's Point is a rocky promontory of the Shawangunk Mountains, about five miles east of Ellenville, New York, overlooking the Wallkill Valley between the Shawangunk and Highland ranges, at a height, as marked on a ledge at its summit, of 2,340 feet above the sea. This promontory is composed of a very close conglomerate rock, made up of white quartz pebbles, nearly horizontally bedded, the top being a flat table-land. Geologically, this rock is known as the Shawangunk Grit, the equivalent of the Oneida Conglomerate of the Upper Silurian strata. Thinly bedded, Lower Silurian shales of the Hudson River Group, underlie this conglomerate rock, forming the base of the hill on which it rests.

The woods surrounding this table-land are made up of the pitch pine, with some few common deciduous trees, and an occasional white pine and hemlock. The undergrowth of these woods consists of *Quercus ilicifolia*, Wang., *Nemopanthes Canadensis*, D. C., *Sambucus pubens*, Michx., *Rhodora Canadensis*, L., *Viburnum pubescens*, Pursh, *V. nudum*, L., *Cornus circinata*, L'Her., and *C. sericea*, L., *Acer spicatum*, Lam., and *A. Pennsylvanicum*, L., *Aralia hispida*, Michx., *Viburnum lantanoides*, Michx., and great quantities of *Gaylussacia resinosa*, T. & G., and of *Vaccinium Pennsylvanicum*, Lam.

My visit was made in the latter part of August when little else than Compositæ was in bloom. Besides the commoner plants of this order, *Solidago squarrosa*, Muhl., and *S. latifolia*, L., were plenty. A few specimens of *Gentiana quinqueflora*, Lam., were found towards the base of the hill. *Spiranthes gracilis*, Bigelow, grows abundantly among the bushes, both on the table-land and at its base, often with but a single tuber, instead of "roots clustered" as in its specific description. Two specimens of *Botrychium lanceolatum*, Angst., were found in woods near the Point.

The flora of the top of this elevated ridge is characterized by an abundant growth of *Pinus rigida*, Miller, very much stunted in growth, fruiting indeed at two feet from the ground and forming low, straggling bushes, few of them more than five feet high, the leaves

also shortened to half the length of those borne by ordinary trees of this species. *Arenaria Grœnlandica*, Spreng., grows on all the exposed rocky ledges, and *Clintonia borealis*, Raf., in a sphagnous swamp and also in the woods at the base of the hill. The shrubs mentioned above are also found on the summit.

A broad, shallow pond, a mile or so north-east of the Point, on the table-land, well repaid exploration. Here the small form of the white water-lily, (*Nymphæa odorata*, Ait., var. *minor*, Sims) grows plentifully. *Eriocaulon septangulare*, With., *Lobelia Dortmanna*, L., and *Isoetes echinospora*, Durieu, var. *Braunii*, Engl., were found in shallow water near the shore, and *Drosera rotundifolia*, L., with *D. intermedia*, Hayne, var. *Americana*, D. C., in fine condition in the *Sphagnum* along the margin.

N. L. BRITTON.

Arthrocladia villosa, Duby.—This beautiful species, which is nowhere very abundant, has been considered especially rare in America. A specimen found many years ago gave it a place in the *Nereis Boreali Americana* of Dr. Harvey. It was not reported again until a single specimen was found by Mr. Collins a few years since at Falmouth Heights, Mass. In 1881 I found another solitary specimen near the same place at Menahant, a summer settlement in Falmouth. In 1882 I looked in vain for it all summer long, but a single plant was found that year by Mrs. Chambrè. But the latter part of July this season, after a severe south-west wind which lasted several days, this rare plant was washed up quite abundantly. I secured and mounted over eighty specimens, and might have collected many more. Some of these are about fifteen inches in length and several are complete, having the holdfast. It seems probable that it grows in the deep water in the narrow part of Vineyard Sound, and is torn up only when there is an unusual disturbance of the water.

Springfield, Mass.

GEORGE W. PERRY.

Notes from N. Lower California.—On a recent trip into the mountains of Lower California, my father, H. C. Orcutt, and myself found *Quercus Palmeri*, *pungens* and *Emoryi* abundant at an elevation of 4,000 to 6,000 feet, and as far south as San Rafael Valley, near where we found *Pholisma arenarium*, Nutt., on the roots of *Q. Palmeri*. From north of the boundary, and south over a hundred miles by road, we found *Adenostoma fasciculatum* and *sparsifolium* still abundant, and, with them, *Arctostaphylos pungens* and *Garrya flavescens*, var. *Palmeri*, Watson. The latter we found from 2 to 10 feet high. In general appearance of leaves and stalk (although the bark does not exfoliate, and is grayish) it closely resembles the manzanitas, and we found it to have a similar large root, which only differed from that of our *Arctostaphylos* in being black instead of reddish colored. Among the graceful piñons (*Pinus Parryana*), we found the "sotole" (*Nolina Palmeri*) abundant and presenting the appearance of coarse grass growing near water, but in reality growing in the

dryest places. Its root is used by the Spaniards as a substitute for soap in washing their garments. Among the rocks on dry hills, to the south of the piñons, we detected *Agave Pringlei*, Engelm. (ined.), in bloom July 28, 1883, and found the fibre of its long and slender leaves to be preferred by the Indians, for making ropes and other articles, to that of the more abundant *A. deserti*. The root, leaves and flower-stalk of both species are, after being roasted, eaten by the Indians, who also asserted that they ate the golden lichen, *Evernia vulpina*, which grows in small quantities, especially on dead manzanitas, among these mountains.

Among the large pines or piñons (*Pinus Jeffreyi*?), to the south of the piñons, we found the pretty *Ivesia Baileyi*, Watson, in the crevices of the granite boulders that form the immense rocky ridges through this district; and, at the base of these rocks, were many pretty plants, among them the familiar *Aquilegia truncata* and *Pteris aquilina*, and also *Geranium cespitosum*, *Arenaria alsinoides*, Willd., *Eriogonum Parishii*, *Galium pubens* and *angustifolium*, etc., and on the grassy plains or meadows, between the stretches of pine forest, were *Verbena littoralis*, HBK., *Cnicus Drummondii*, var. *acaulescens*, *Eriogonum foliolosum*, Wats., *n. sp.*, and a variety of *Horkelia Californica*. On little pools or lagoons we found *Potamogeton natans*, L., and *Polygonum Hartwrightii*, Gray.

San Diego, Cal.

C. R. ORCUTT.

Autumn Foliage.—A comparison of notes on the local condition of foliage, made on October 5th, with similar notes of October 1st, 1882, shows an interesting difference. This is so marked in many cases that it is worthy of note, especially since the opinion has gained some ground among botanists that the appearance and fall of the leaves occur at nearly the same dates each year. From my notes it appears that the season, as regards foliage, is at least ten days later this year than last. A few species, the black and red cherries, the apple, pear, peach and plum are at about the same stage. The difference appears slightly in the golden willow, sugar-maple and silky cornel; to a marked degree in the ash, chestnut, shagbark, American and slippery elms, all the oaks (eight species), and the fox-grape, while it is very decided in the flowering dogwood, beech and pignut. The three last were perfectly fresh and green on the above date, while my notes for 1882 describe them as largely brown and dead at that time.

Of course the explanation of this difference is to be found in meteorological conditions, which I am able to give for both years as follows:

	AUGUST.			SEPTEMBER.		
	Temp.	Rel. Humidity.	Rain.	Temp.	Rel. Humidity.	Rain.
1882 . . .	67.3°	66.1	0.99	63.7°	77.2	16.56
1883 . . .	66.3°	69.2	2.91	59.9°	71.0	2.27

The ash and sugar-maple have borne an unusual abundance of fruit this season throughout all this region (Orange County, N. Y.) Has anyone noticed a similar fertility elsewhere?

Mountainville, N. Y.

W. E. STONE.

Botanical Notes.

Motion of Stamens in Centaurea.—At a recent meeting of the Philadelphia Academy of Natural Sciences, Mr. Meehan called attention to fresh specimens of the flowers of *Centaurea Americana*, a native of Texas, which had been sent to him from Newport, accompanied by a letter from Miss Mary Powell, in which she describes a peculiar motion of the stamens. After describing and illustrating the structure of the flower in detail, the speaker remarked that if the point of the united stamens be touched, the pollen will begin to overflow and the pistil appear above the mass. If the pistil be now touched, the entire floret bends from side to side or makes a circular motion. Sometimes the motion will be communicated to other florets, which may bend in different directions. The *Centaurea* is closely allied to the thistles, and Mr. Meehan had found in all the species of the latter which he had examined the same kind of motion, although in our common field thistle it is quite feeble.

The irritability of the anthers had been partially described by Sachs and other German botanists, although none of them alludes to a movement of the entire floret. They believe the movement to be due to contractility, but the speaker suggested that some other mechanism is probably involved, as the motion is only to be observed when the pollen is present. If the latter be all brushed off the motion ceases.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College, Tuesday evening, April 10th. In the absence of the presiding officers, Mr. B. F. Braman occupied the chair. There were twenty-six persons present.

Field Committee.—The chairman appointed Messrs. Day, Rudkin and Hollick a committee on field excursions for the current year.

The Rev. A. B. Hervey, on invitation of the chair, made some remarks on the study of algæ.

Four persons were elected active members.

At the regular meeting held Tuesday evening, May 8th, the President occupied the chair and twenty-one persons were present.

Mr. Braman exhibited specimens of *Pistia spathulata*, Mx., from Florida. The President remarked that fossil specimens of this genus were found in the cretaceous rocks of Wyoming.

Mr. Britton showed specimens *Veronica hederæfolia*, L., and *Lithospermum arvense*, L., from a new locality, Kingsbridge, N. Y.

Mr. Bicknell showed specimens of *Carex Pennsylvanica*, Lam., and of *C. varia*, Muhl., which closely resembles it, and pointed out an important difference by which they may be distinguished, this being the presence in *C. Pennsylvanica* of long, spreading rootstocks by means of which plants covering a considerable area are connected. In *C. varia* these are not to be found.

One person was elected an active member.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.] New York, Oct. & Nov., 1883. [Nos. 10 & 11.]

Notes on the American Species of *Tolypella*.

By T. F. ALLEN.

(Plates XXXVII.-XLII.)

In this paper some new species of the genus *Tolypella* will be described and an account given of those already known to inhabit America, which promises to yield an unusual number of these interesting plants.

The two families into which the Characeæ may be divided are characterized mainly by the structure of the coronula of the sporangium, this being formed by a division of the cells, which, like spiral tubes, envelop the nucleus. In the *Characeæ* a *single* septum in each tube, near its extremity, gives rise to a circle of *five* cells on the top of the sporangium. In the *Nitelleæ* two septa form, and a double series, of five cells each, produces a coronula of *ten* cells; this, in some species, is detached as the fruit matures (not increasing in size, *pari passu*, with the enveloping cells) and is *evanescent*, while in others it is *persistent*. The *Nitelleæ* consist of two genera mainly differentiated by the position of the *antheridium*, which in *Nitella* is *apical*, on the primary ray of the leaf, while the sporangia are lateral on the node below the antheridium. The leaves also possess but one leaf-bearing node, though they may divide repeatedly. In *Tolypella* (A.Br.) Leonh., the leaves have 1-3 nodes, bearing leaflets and many-celled terminals; the leaflets do not equal in size the primary ray, are many-celled and often themselves have nodes which bear leaflets. *Antheridia* are one or several, *lateral on the nodes of the leaf and leaflet*, and also at the fundus of the verticil within the leaves (when, like the sporangia, they seem to arise from the cells surrounding the base of the leaf [the basilar node] T. F. A.), mostly with an elongated stipe.* In most species, the leaf-node seems to possess six principal nodal cells which encircle the leaf, three of these giving rise to fruit, and three to leaflets. Sometimes we find four fruiting cells and two leaflets, and sometimes the reverse. In a few instances the nodal cells are sub-divided, and an increased number of fruits and leaves is found. This is now and then observed in *T. intertexta* in the sub-division of a nodal cell, so that double sporangia are produced, one above the other. At first sight this looks like a circle of four sporangia with a central antheridium. The fruiting cells are always on the ventral (looking inward toward the axis of the plant) aspect of leaf, and the leaflets are always dorsal. The antheridium seems to occupy

* Prof. Braun says: "Sporangia *surrounding* the antheridium in large numbers on the nodes of the leaf" etc. Numerous preparations of fresh specimens with careful staining of the protoplasm, and good sections of the nodes, have failed to show, in any American species, that the sporangia arise from cells "*surrounding*" the base of the antheridium.

the first or central, the sporangia the lateral cells. This rule seems also to be observed in the fundus of the verticil, in which we find the antheridium on the inner aspect of the basal node, while the sporangia are lateral or even external, and, in other cases, these basal cells produce adventitious leaflets instead of sporangia, carrying out the same plan found on the leaf-node. The coronula is persistent or evanescent.* The leaves which bear fruit become compacted into more or less dense heads (or "nests"), owing, apparently, to a diminished growth of stem and leaf; the verticils are approximate, often closely so, and the leaves are incurved, forming a tangled mass.

The following key has been arranged to include the species known at this time.

KEY TO THE SPECIES OF TOLYPELLA.

I. OBTUSIFOLIA.—*Coronula evanescent*. Sterile leaves undivided.

A. Ultimate cell of the primary ray of the leaf longer than the other cells. *T. longicoma*, A.Br.

B. Ultimate cell not longer.

† Leaflets attenuate.

2. Marine. Nucleus 370–500 μ long. *T. nidifica*, Leonh. (Europe.)

3. Submarine. Nucleus 300–340 μ long. *T. Normaniana*, Ndst. (Europe.)

† Leaflets not attenuate.

4. Saline. Nucleus 300–360 μ long. *T. glomerata*, Leonh.

5. Fresh water. Nucleus 425–475 μ long, maturing in fall. *T. comosa*, Allen.

II. ACUTIFOLIA.—*Coronula persistent*.†

A. *Indivisa*. Sterile leaves undivided.

6. Nucleus 350–375 μ long, leiopyrena. *T. prolifera*, Leonh.

7. Nucleus 425–450 μ long, oxygyra. *T. fimbriata*, Allen.

B. *Divisa*. Sterile leaves divided (usually into four terminal leaflets.)

† *Attenuata*. Leaflets attenuate.

§ Secondary ray undivided, sterile.

8. Nucleus 285–355 μ , rays 4–7-celled. *T. Californica*, A.Br.

9. Nucleus 330–340 μ , rays 3–4-celled. *T. stipitata*, Allen.

§§ Secondary rays divided, fertile.

10. Nucleus 360–425 μ long. *T. intricata*, Leonh.

11. Nucleus 450–500 μ long. *T. intertexta*, Allen.

†† *Non attenuata*.

12. Ultimate cell mucroniform; nucleus 480–500 μ . *T. apiculata*, A.Br. (S.Am.)

T. longicoma, A.Br. (MS., 1855).—The following account of this species is taken from "Braun's Fragmente, by Nordstedt."

"*T. longicoma* is related to *T. nidifica* and *glomerata* from which it

* It seems persistent in all the species having acute leaves and evanescent in all the species with obtuse ones.

† In number 11 the coronula is *sub-persistent* only.

differs in its compact, tufted growth, thin, delicate stem and leaves, want of all incrustation and flexibility. The sterile leaves are simple and very long, the ultimate segment (in the fertile leaves likewise) *always elongated*, but little attenuated. The fertile heads are small, compact, long tufted. The first segment of the fertile leaf is extremely short, and here only are very short lateral rays, *which are quite wanting on the the innermost, smallest fertile verticils*, or are so dwarfed as to be indistinguishable. Since the delicate cell-membrane tears easily on preparing the plant, it is difficult to spread it out and examine it. It forms dark green, thick tufts a hand high. Stem not over 480μ thick; leaves in the sterile verticil 6, simple, apparently 3-celled, and about 40^{mm} long. I saw, however, only two cells, often only one. The first cell is $20\text{--}25^{\text{mm}}$ long, $30\text{--}38\mu$ thick, also the second cell seemed very long and but little attenuated. Fertile verticils bunched; bunches complicated by axillary shoots; the first segment of the fertile leaf is very short, bearing seeds and some (2) small, 3-celled, lateral leaflets (rays); the terminal leaflet larger, 3-celled, *the middle or even the lowest cell the longest*. (Italics mine. T. F. A.) Terminal cell always long, curved, attenuated, rounded at the point. The innermost fertile leaves are very short and apparently (to me) without lateral leaflets, only with seeds on the first node, and monœcious, though I saw the antheridia fallen from the plant only. Sporangia with a short, blunt, rounded coronula, often with the base of the latter much swollen, several together, seldom with short stipes. Nucleus *brown*, with 9 striæ and slight angles. Sporangia $580\text{--}600\mu$ long, $420\text{--}430\mu$ broad, nucleus $360\text{--}400\mu$ long, $300\text{--}320\mu$ broad; antheridia 360μ in diameter.

"Swamps near Columbus, Ohio (com. Lesquereux, 1855). The specimens are mixed with another species, apparently *N. flexilis*."

I have been unable to obtain specimens of this species, nor does Professor Lesquereux know the locality in which it was collected. I await its rediscovery.

Tolypella glomerata, Leonh.,—This is characterized as follows, by A. Braun in his Characæ of Africa:

"Statura mediocris, color incrustatione glaucus vel cinerascens. Folia verticillorum sterilium indivisa, fertilia capitulorum (et nonnunquam transitoria) simpliciter divisa, radiis 3-4- cellularibus parum attenuatis obtusis. Sporangia in divisura foliorum et in fundo verticilli aggregata, nucleo ovali, $0.30\text{--}0.36^{\text{mm}}$ longo, fusco, 8-9-gyrato."

Var. ABBREVIATA, *nov. var.*, differs as follows:

Statura variabilis, color incrustatione cinerascens vel munda. Folia et sterilia et fertilia *abbreviata*, radiis 3-cellularibus vix attenuatis obtusis. Sporangia aggregata, coronula evanescente, nucleo fusco $300\text{--}335\mu$ longo, striis 6-8, acutis vix prominulis. Antheridia longe stipitata $230\text{--}380\mu$ diam.

I have thus far discovered two forms: one, *forma incrustata*, large, to 0.15^{m} high, densely incrustated, with smaller antheridia (230μ in diam.) and larger nuclei (335μ long), striæ 7 to 8. Collected by Mr. Pringle in alkaline pools in Arizona, April, 1881, and again in 1882. The other, *forma pygmæa munda*, small, $0.02\text{--}0.03^{\text{m}}$ high, without the slightest incrustation, with very short leaves (as above), larger anther-

idia (380μ in diam.) and smaller nuclei (300μ long) with only six striæ, collected by Prof. Macoun, Canada, Pacific R.R. survey, west of the Saskatchewan, August, 1881. With all these differences I do not, however, feel warranted in giving either form a distinct name, since the general habit of the plants seems the same, namely, the short leaves and rays, the persistently three-celled and not attenuated terminals, the equally stipitate antheridia, similar sporangia and nuclei with varying striæ, in both sharp and slightly prominent. Other forms will doubtless be discovered which will enable us to group them with greater certainty.

In my plants the sporangia are numerous in the fundus of the verticil, both without and within the base of the leaves; but, on the fertile node of the leaf, they are regularly disposed on the ventral aspect, two, with the intermediate, rather long-stalked antheridium, while there are regularly three leaflets or rays on the dorsal aspect. The coronula is evanescent, and the ends of the enveloping cells of the sporangium are swollen (Plate Fig. 4). Mr. Pringle's plants have mature fruit in April (the usual time for *T. glomerata*), and Prof. Macoun's are in their prime in August. This fact, together with the much larger antheridia and rather smaller nuclei of the latter, with only six striæ, may prove sufficient to distinguish the forms as distinct sub-species. Further collections are needed.

TOLYPELLA COMOSA, nov. sp.—Minor, monoica, statura 0.05–0.10^m, color incrustatione cinerascens. Folia verticillorum steriliū indivisa, 3-articulata, fertilia in capitula congesta, simpliciter divisa, radiis 3-cellularibus, obtusis, non attenuatis. Sporangia in divisura foliorum et in fundo verticilli aggregata; coronula evanescente; nucleo atro, ovali $425\text{--}475\mu$ long., $320\text{--}360$ lat., 7–8-gyrato, striis prominulis, obtusis. Antheridia sessilia, $400\text{--}425\mu$ diam.

This plant is allied to the European *T. nidifica*, Leonh., from which it differs in its fresh water habit, smaller size, smaller antheridia and persistent coronula. It is thickly incrustated, having a greyish color even when first taken from the water, and is quite fragile. The fertile whorls are compact and compound, from numerous short axillary shoots. The leaves of the sterile verticils are simple, long, and have three segments. The fertile leaves have a short basal segment, then a fertile node consisting usually of three leaflets of unequal length, and three fruiting cells on the ventral aspect; these produce, usually, two sporangia and one intermediate antheridium, but occasionally we find two antheridia and one sporangium. The central cell is, however, always an antheridium, and the latter is sessile or nearly so. The lateral leaflets are longer than the dorsal leaflet; the terminal division of the leaf, above the fertile node, is elongated, 2–8^{mm}, and three-celled. These numerous elongated leaflets clothe the plant as with hairs, hence the specific name *comosa*. The first segment of the leaflets is the longest, and the terminal segment usually the shortest. The diameter of the leaf, below the fertile node, averages 300μ (in *T. nidifica*, 400μ), of the terminal segment near the tip 100μ , (in *nidifica*, 190μ .) The main stem, below the first fertile verticil, averages 360μ in diameter. The primary verticil consists of seven leaves with some adventitious leaflets and sporangia, which

are usually developed from the cells of the basal leaf-node external to the verticil, though a few are seen within the whorl. The sporangia at the fundus of the verticil are comparatively few in this species.

This plant was gathered in company with *T. intertexta*, Allen, in Seneca Lake, N. Y., near Geneva, at a depth of about ten feet of water, in August, 1882.

Tolypella prolifera,* Leonh.—Plant large, clothed with broad and elongated green leaves, rarely incrusted. Sterile leaves simple, three to four-celled, elongated, acute. Fertile leaves with two (rarely three) fertile nodes and a three- to four-celled terminal, acute; rays of the leaf two to three at each node, 3-4-celled, mostly simple (fertile nodes have rarely been seen on the rays of the leaf in American plants), acute. The mucronate tip of the leaves and rays is somewhat elongated, never short and abrupt, from 100 to 120 μ long, and 45-50 μ broad at base; the leaf just below this tip is about 100 μ in diameter. Sporangia numerous in the fundus of the verticil and on the ventral aspect of the leaf-nodes; coronula persistent, superior cells longer than the inferior; nucleus chestnut-colored, round-oval, 345-375 μ (the largest fully mature) long, 300 μ broad; striae 8-9, inconspicuous. Antheridia short-stipitate, 300 μ in diameter.

I am fortunate in possessing some of E. Hall's original specimens, determined by the late Prof. Braun, and have been able to compare other plants with this. Braun, in Nordstedt's "Fragmente," gives as localities: from Engelmann's herbarium, "Upper Missouri, Pinois Springs, Hayden's survey, *Forma munda cinerascens*, 1858," and "Athens, Illinois, E. Hall." It has been sent to me by Prof. Macoun, "Flora of the great Plains, railway survey, Canada, near Bottsford, Aug. 6th, 1879." I have also received very young plants, having numerous, long, sterile leaves from the base, overtopping the whole plant, from Mr. Horsford of Vergennes, Vt., though there is some doubt as to their determination.

Doubtless the species will be found to be not uncommon in the northern portions of the country and in Canada.

TOLYPELLA FIMBRIATA, nov. sp.—Statura mediocris, 0.15-0.20^m. alt., viridis. Folia verticillorum steriliūm indivisa rarissime divisa, 2-3-articulata, acuta. Folia fertilia duplicato divisa, radiis fertilibus 3-4-cellularibus. Sporangia in divisura foliorum et in fundo verticilli aggregata, coronula persistente, cellulis superioribus longioribus quam inferioribus; nucleo fusco, ovali, 425-450 μ long, 330-350 μ lat., oxygyro; striis 9-10, prominulis, acutis; antheridio stipitato, 300-335 μ diametro.

From *T. prolifera*, to which this species is most nearly allied, it differs in its smaller size, larger fruit, oval nuclei, with more numerous and prominent sharp angles.

The plant has a long, simple stem, naked (with perhaps one small verticil near the base) nearly to the compact head of fertile leaves. Just below this is usually the sterile verticil of 7-9 leaves, 0.05-0.08^m. long, which extend far beyond the fertile head, forming a coarse fringe or involucre of leaves. Very rarely, the sterile leaves are divided, I have seen but one specimen divided:

* Description taken from American specimens. No satisfactory description of the species has as yet been given.

T. Californica, A. Br.—The following is taken from Braun's "Fragmente," edited by Norstedt, 1883.

"Color, a fine dark green, without incrustation. Habit somewhat similar to *T. nidifica*, but with more numerous verticils and heads, one above another; nothing of the long lower leaves could be seen in in the fragments. The number of leaves, whether the lower were simple and whether there were sporangia in the fundus of the verticils, must be determined by better specimens. Terminal cell $0.10-12^{\text{mm}}$. long, about 0.05^{mm} . broad. An antheridium which had fallen off measured 0.44^{mm} . in diameter, but further measurements are needed. Sporangia almost globular; nucleus dark brown, but transparent, with 8-9 visible "windings" (on one side), *smooth*, 0.38^{mm} . long, 0.32^{mm} . broad. Very nearly related to *T. nidifica*, but distinguished by its sharp tips; from *T. apiculata*, separated by its smaller sporangia with fewer windings, and by its general appearance; also distinct from *T. longicoma* by its many-celled segments and sharp tips, as well as by the shortness of the ultimate cells.—North America, Maria County, California, under willows, in slow-flowing streams. H. Bolander, Mar. 27th, 1865, comm. Dr. Engelmann, Aug. 1869."

I have received specimens from Dr. Engelmann from "Marion Co., Cal., H. Bolander, April, 1863," and have also examined very fine and perfect specimens in Prof. Gray's Herbarium at Cambridge, from "Swamps near San Rafael, Marion Co., Cal.," and am able to supplement Prof. Braun's description as follows:

Plant 0.10^{m} , becoming much branched (bushy): the fertile verticils on elongated peduncles, not crowded into dense masses; stems grass-green, conferva-like, about 600μ in diameter. Sterile nodes two to four, of 12-15 leaves; of these, 6-8 seem to be normal and the others shorter and adventitious. Leaves about 360μ in diameter, once divided into four leaflets, which are 4-6- or 7-celled; the adventitious leaves (intermediate in the verticil and not in the normal series), are usually shorter and not divided. The measurements of the leaflets gave the following diameters: first segment 285, second 240, third 210, fourth 150, fifth 135, sixth (or mucro) 50 broad and 170μ long. The articulations are some what constricted and the walls thin and diaphanous. The fertile verticils are densely crowded with leaves and fruit, the internodes being very short (as in other *Tolypelleæ*). The fertile leaf has usually two fertile nodes, each bearing three fruiting-cells (one antheridium and two sporangia) on its ventral aspect and three leaflets or rays on its dorsal. The rays and longer terminal leaflet are 4-6-celled. Sporangia nearly globular, *coronula persistent*, the ultimate cells somewhat elongated. Nucleus brown, with 8-9 striæ, which are not prominent, varying from $285-335\mu$ long and $300-320\mu$ broad. Antheridium rather long-stalked, $240-265\mu$ in diameter (I saw none so large as those Prof. Braun speaks of). Sporangia in the fundus of the verticil, but not as numerous as in some other species.

T. STIPITATA, *nov. sp.*—Statura $0.10-0.15^{\text{m}}$. alt. Color viridis. Folia verticillorum steriliūm divisa, ter-articulata, acuta. Folia fertilia divisa, nodis fructificationem gerentibus duobus, radiis indivisis 3-cellularibus acutis. Capitula fertilia laxa. Sporangia in divisura foliorum et in fundo verticilli aggregata numerosissima, longe stipi-

tata; coronula persistente, cellulis non elongatis; nucleo fusco, 335μ longo and 260μ lat., 7-8-striato, striis acutis, sub-prominulis. Antheridio $275-300\mu$ diametro, longe stipitato.

This interesting species appears to be intermediate between *T. Californica* and *T. intricata*. From the former it differs in the fewer segments of the terminals, and from the latter in the simple rays and smaller sporangia and antheridia. It has a loose habit of growth, the fertile verticils having comparatively long peduncles, not crowded into so dense heads as in other species. The fundus of the verticils is crowded with sporangia and antheridia on long stipes, which seem to take the place of leaves. There are but few leaves, generally four, to each verticil, with two shoots of new verticils (as shown in Plate). The peduncle of the fertile head measures 2.40mm . from the verticil to the first fertile whorl, 2.40mm . to second whorl, 1.50mm . to third 1.20mm . to fourth, showing the looseness of the compound fertile head. In *Tolypella* generally, the separation of the verticils of the fertile heads is very slight, so that a compact mass is formed.

I have received but one specimen of this species, collected by Mr. T. S. Brandegee, in a pond near Mt. Carbon, Elk Range, and forwarded to me by Mr. John H. Redfield of Philadelphia.

T. intricata, Leonh.—Monœcious. Robust, $0.20-0.40\text{m}$. high; growing in mossy bunches; light green, in age becoming greyish or brown with incrustation, and brittle. Stem much branched from the base up. Lower verticils long-leaved, spreading; the upper shorter, compacted into a thick head (nest-like). Verticils composed of 6-7 large leaves, with as many more small (accessory) ones. Sterile leaves once divided, the fertile ones mostly twice divided. Fertile leaves with 2-3 nodes producing leaflets; leaflets of unequal length, 4-5-celled, those of the first leaf-node divided, fertile, attenuated to the tip, the terminal cell short and acute. Sporangia on the nodes of the leaves and rays, and very numerous in the fundus of the verticil. Coronula persistent; nucleus light brown, oval, with 10-11, prominent angles. Antheridia $320-350\mu$ in diameter.

This species germinates in the fall and fruits in the following spring, ripening by the end of April or in May, and quite dying down and disappearing by the beginning of June (in Europe).

I have received one specimen of this species from Canada (a typical form), and it is to be expected from various parts of the country.

T. INTERTEXTA, nov. sp.—Statura robustior, $0.4-0.5\text{m}$. alt., color incrustatione demum cinerascens. Verticillis inferioribus remotis, foliis sterilibus 8, $60-80\text{mm}$ long., divis; terminalibus 4-cellularibus, acutis. Folia fertilia duplicato (vel rarius triplicato) divisa, nodis fructificationem gerentibus duobus; radiis divis, fertilibus 4-cellularibus (rarius 3-5), acutis, mucrone 85μ long., $55-65\mu$ lat. Sporangia in fundo verticilli et in divisura foliorum aggregata, coronula elongata, sub-persistente; nucleo ovali, $450-475\mu$ long., fusco, 10-gyrato, striis acutis, sub-prominulis. Antheridia brevi-stipitata, $320-350\mu$ diametro.

This large and handsome *Tolypella* differs from its allied species, *T. intricata*, by its habit, its large sporangia, its peculiar coronula and

the time of fruiting (fall). The leaves are abruptly pointed with a short and stout mucro. The sporangia are numerous, often double from a single cell (as in Plate XLII., Fig. 3). The coronula is peculiar in its oblique direction and sub-persistent character, and becomes detached when the sporangium is quite old. The dense interweaving of the divisions of the leaves surrounding the fertile heads suggests the specific name.

Gathered from deep water (10-15 ft.) in Cayuga Lake, N. Y., August, 1882. I have also received a fragment from Canada, collected by Miss Cary, and sent by A. L. Kemp, LL.D.

EXPLANATION OF PLATE XXXVII.—Fig. 1. Plant, natural size from Arizona. Fig. 2. Sketch of the base of a verticil showing the simple, sterile leaves, not longer than the compact fruiting verticils, which are incompletely outlined. Fig. 3. A portion of the stem, showing two crowded fertile whorls with numerous sporangia at the base of the leaves. Fig. 4. A mature sporangium. Fig. 5. A mature nucleus. Fig. 6. A tip of a leaf. (Figures 2 to 5 are from the Arizona plant, and Figures 7 and 8 from the dwarf Canada plants). Fig. 7. A node of a leaf, the antheridium having fallen. Fig. 8. A sporangium prior to the falling of the coronula.

EXPLANATION OF PLATE XXXVIII.—Fig. 1. Plant, natural size. Fig. 2. A fertile node magnified 25 diameters, showing the fertile cells *an* on the ventral aspect, usually with two sporangia and one antheridium. In some places the fruit has been rubbed off in preparing the specimen for the camera. Fig. 3. A fertile node of a leaf, ventral aspect, showing two antheridia and one sporangium. Fig. 4. Dorsal aspect of a fertile node, showing three unequal, 3-celled leaflets. In all these figures space does not permit the delineation of the long terminals of the leaves. Fig. 5. The apex of a sporangium, showing the evanescent coronula, magnified 200 diameters. Fig. 6. A mature nucleus with eight prominent, blunt angles, magnified 50 diameters.

EXPLANATION OF PLATE XXXIX.—Fig. 1. Plant natural size. Fig. 2. A portion of a fertile verticil, with two nodes of a leaf and two fertile rays on the lower node, magnified 25 diameters. Fig. 3. A fertile leaf-node showing the stipes of two antheridia, which have fallen, magnified fifty diameters. In this species we frequently find two antheridia (central) and two sporangia (lateral) on the ventral aspect of a leaf; in which case there are usually but two rays on the dorsum of the leaf. Fig. 4. The coronula magnified 200 diameters. Fig. 5. A mature nucleus magnified 200 diameters. Fig. 7. Tip of leaf.

EXPLANATION OF PLATE XL.—Fig. 1. Plant, natural size (fresh specimens will modify this sketch). Fig. 2. A leaf magnified 25 diameters, showing the undivided sterile rays. Fig. 3. The tip of a sporangium, showing the persistent coronula x 200 diameters. Fig. 4. A mature nucleus, magnified 50 diameters. Fig. 5. The node of a sterile leaf, showing its division into 4 leaflets x 25 diameters. Fig. 6. The tip of a leaflet magnified 50 diameters.

EXPLANATION OF PLATE XLI.—Plant, natural size, with the fertile heads on one branch at A, the other heads having been removed (as at B) to show the arrangement of the sterile leaves. Near the bottom of the stem there is a small verticil of sterile leaves. Fig. 2. A fertile shoot, taken at A in Fig. 1, magnified 5 times to show the general form. All the sterile leaves have been removed, except from the lowest fertile verticil. Usually there are four sterile leaves, each divided into four leaflets, and two shoots bearing new fertile verticils from each verticil. Some of the normally sterile leaves of the upper verticils become fertile. There are usually 5-6 successive series of fertile verticils, the uppermost bearing fruit in the verticil, and about six fertile leaves (magnified 5 diameters). Fig. 3. A fertile verticil with numerous, long-stipitate fruits, showing at B, the basal node of a leaf that has been removed; magnified 40 diameters. Fig. 4. The dorsal aspect of a fertile ray x 40. Fig. 5. The ventral aspect of a node of a fertile ray (the antheridium removed), magnified 25 diameters. Fig. 6. The apex of a ray, showing the long slender point, magnified 200 diameters. Fig. 7. The coronula of a sporangium magnified 200 diameters. Fig. 8. A mature nucleus magnified 50 diameters.

EXPLANATION OF PLATE XLIII.—Fig. 1. Plant natural size, showing only the upper portion. Fig. 2. A portion of a leaf, showing two fertile nodes, and fertile rays from the lower node, magnified 25 diameters. Fig. 3. Another leaf, showing two twin sporangia, each pair from one cell (divided horizontally). Figs. 4 and 5. Tips of leaves, magnified 200 diameters. Fig. 6. The elongated oblique coronula. Fig. 7. Top of an old sporangium after the coronula has become detached. Fig. 8. The nucleus magnified 50 diameters.

New Species of Fungi.

By J. B. ELLIS and BENJAMIN M. EVERHART.

SPHÆRELLA (*LÆSTADIA*) *POLYSTIGMA*.—Perithecia large, scattered thickly over the lower surface of the leaf, covered by the blackened cuticle, subhemispherical, collapsing; ostiolum papilliform, at length perforated; asci $35-40 \times 8\mu$, oblong, sessile; sporidia biseriate, ovate-elliptical, continuous, subhyaline, $10-12 \times 3-4\mu$, in shape very much like apple-seeds.

Allied to *S. carpineae*. On fallen oak-leaves. Ohio. Kellermann.

SPHÆRELLA *PANDURATA*.—Hypophyllous; perithecia globose ($.17-.25^{\text{mm}}$), buried in the substance of the leaf, and, except the slightly projecting, rounded apex, covered by the blackened cuticle; ostiolum papilliform, minute; asci oblong-cylindrical, $50 \times 7\mu$; sporidia biseriate, fusiform, 4-nucleate, yellowish, constricted in the middle and bulging out each side of the constriction, $10-12 \times 3\mu$.

On fallen oak-leaves. Plainfield, N. J., September, 1883. G. F. Meschutt.

MELANCONIS *EVERHARTII*, Ellis.—Perithecia globose ($.25^{\text{mm}}$) in compact clusters of 4-18, just under the outer layer of the inner bark, which is raised into little tubercles about 1^{mm} in diameter, from which arise, in a compact fascicle, piercing the epidermis, the short-cylindrical, obtuse ostiola, their tips perforated with a rather large circular opening; asci clavate-cylindrical, $114-120 \times 19\mu$; paraphyses stout, sparingly septate and granular; sporidia biseriate, oblong-elliptical, uniseptate, nearly hyaline $34-38 \times 11\mu$.

On a fallen sapling of maple. West Chester, Pa., June, 1882.

The ostiola throw off the epidermis, and the perithecia themselves soon after fall out, leaving light colored, circular spots which mark the place of their attachment. The fruit is almost exactly that of *M. Modonia*, Tul., but the more elongated ostiola, the smaller perithecia and deciduous habit distinguish it.

MELANCONIS (*MELANCONIELLA*) *MESCHUTII*.—Perithecia 10-20 ($.25 \times .33^{\text{mm}}$), circinating in a thin, lenticular, black, orbicular or elliptical stroma seated on the surface of the inner bark; ostiola short cylindrical, united in a dirty brown disk bursting through transverse cracks in the epidermis, their tips, in well developed specimens, distinctly 4-cleft; asci (spore-bearing part) about $75 \times 10\mu$; sporidia biseriate, elliptical, very slightly curved, uniseptate and slightly constricted, subhyaline at first, with a faint, transparent, horn-shaped appendage at each end, but these soon becoming absorbed and the spore becoming brown, $14-16 \times 6-8\mu$ (mostly $15-16 \times 6\mu$).

On dead limbs of birch. Plainfield, N. J., June, 1883. George F. Meschutt. *Gelatinosporium betulinum*, Pk., occurs on the same branches, and where the epidermis is weaker, the appearance of the

stroma is different, it being more prominent, and the epidermis being irregularly lacinate-cleft around it. The perithecia soon collapse, so that, on stripping off the epidermis, their position is indicated by little circular concavities around the margin of the stroma. This is closely allied to *M. Decoraënsis*, Ell., but differs in its smaller perithecia and narrower *appendiculate* sporidia.

MELANCONIS (MELANCONIELLA) BIANSA.—Perithecia circinating in a stroma scarcely different from that of the preceding species, globose, .75^{mm} in diameter, soon collapsing, 6–10, their short, cylindrical ostiola with 4-angled or imperfectly cleft tips, united in a dirty brown, narrowly elliptical or suborbicular disk, which slightly rises and bursts through the epidermis by which it is closely girt; asci 190–200x300 μ , evanescent, (8 spored?); sporidia oblong-elliptical, uniseptate, soon becoming brown, and generally with a short, stout, tuberculiform projection at each end, length, without appendage, 35–45x15–19 μ .

Found on the same limbs with the preceding species.

VALSA FAGICOLA.—Stroma formed of the scarcely altered substance of the bark; perithecia circinating, 10–15, subglobose, membranaceous, collapsing (.33^{mm}), abruptly contracted into a slender, cylindrical neck about .33^{mm} long, the necks all converging and piercing the epidermis in a small, papilliform, black disk; tips obtuse, with a rather broad opening; asci (spore-bearing part) 18–20x3 μ , at first with a convex, hyaline tip which soon disappears, leaving them truncate above; (paraphyses?); sporidia biserial, cylindrical, hyaline, curved, 2.5–3.5x.5–.75 μ .

The asci are arranged in a racemose manner, like those of *Valsa ciliatula*, Fr., of which this might perhaps be considered a small form.

On dead limbs of *Fagus ferruginea*. West Chester, Pa., June, 1882. E. H. J. and G.

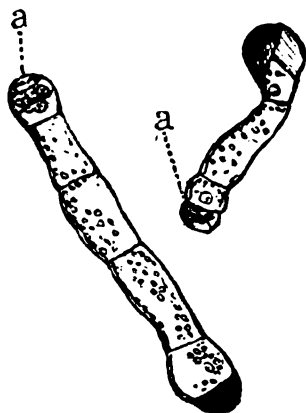
Pinus Banksiana.—The *Gardener's Monthly* for 1873 gives an account of the large size of *Pinus Banksiana* at Marquette and other places in the Lake Superior region. Coming across the continent from the Pacific coast over the Northern Pacific R. R., the first tree of the distinctively Atlantic group to meet us is *Pinus Banksiana*. At Motley, in Morrison County, Minnesota, the trees seemed to be about 40 feet high, and some were 4 feet in circumference. Soon after meeting these we came to *Pinus rigida*, black spruce, white pine and tamarack. The forests—if scattered groups of trees might be so called—had a comparatively young look, and seemed to tell of a natural march of forest growth westward.

THOS. MEEHAN.

Fern Notes.—Last spring I examined with considerable care the development of the prothallia of *Struthiopteris Germanica*, and found that they were very distinctly diœcious. In about five weeks from the time the spores were started the first antheridia were mature; but it was more than six weeks *later* before mature archegonia were noticed, and these were on different prothallia. The

prothallia bearing the archegonia were like those in most ferns, and had the heart shape characteristic of the fern-prothallium. In no cases were perfect antheridia found upon these, while, on the other hand, none of the male prothallia was found to subsequently develop archegonia, although carefully watched.

The male prothallia were much smaller, and, though sometimes heart-shaped, were generally more or less irregular. In a few cases, there was observed on the prothallia an antheridium, which consisted simply of a row of four or five cells, as shown in the annexed figure.



The conditions under which they were grown may have affected their development. The spores were sown rather thickly under a small glass in an ordinary room. These gave rise principally to the male prothallia, though a few developed into the female form. A number of them was transferred, when a few weeks old, to a hot-bed, and these produced a much larger proportion of the female prothallia.

The spores were gathered the last of March, having therefore remained on the plants through the winter. They began to germinate in five days from the time they were sown.

It was found that the spores of *Onoclea sensibilis* germinated with equal promptness.

On examining a number of prothallia of *Aspidium spinulosum*, gathered on the 17th inst., one was found with a well-marked fibro-vascular bundle, although the vessels were not perfect.

Detroit, Mich.

DOUGLASS H. CAMPBELL.

Cleistogene flowers.—*Nemophila maculata*, Benth. At Clark's Ranch, on the Merced River in California, I found this species wholly cleistogene in June last, in the cultivated spots near the stream. As in all cleistogamous plants, every flower was fertile, and the weight of a small plant covered with seed vessels was remarkable. Out of what must have been many hundreds of plants which came under my eye, I saw but one flower with a perfect corolla.

Impatiens pallida, Nutt.—Along the coast of Alaska, in lat. 56°, in the early part of July I found *Impatiens pallida* with all the flowers which had so far appeared, evidently cleistogene. I could find none with petals. Two weeks later, farther north, in lat. 59°, I found the same plant in apparently the same stage of flowering, with all the flowers having, or having had, corollas. I could see nothing which would suggest any satisfactory reason for the different behaviors.

Opuntia leptocaulis, D. C.—In my garden I have a large bush of the long-spined form of this species. Though several years old it has never borne a flower. Over a year ago a number of small buds appeared, but not one opened, or, indeed, advanced beyond a com-

paratively microscopic stage. But fruit resulted which has taken a full year to mature, and which the past month was of a pretty rosy red. Not a seed was found in any one. This is evidently not a case of cleistogamy, for it is probable that there were no perfect stamens in the buds, or else there would have been seeds. Still, the circumstance is interesting.

Viola sarmentosa, Dougl.—It seems scarcely necessary to put upon record that a violet is cleistogene, for any of them may be expected to be; but perhaps it is as well to note the actual fact. In the woods around Departure Bay, in British Columbia, *Viola sarmentosa* was very abundant, and, at the time of my visit in July last, all the flowers were cleistogamous.

THOMAS MEEHAN.

A Few Additions to the Berzelius Catalogue.—Upon seeing a list of plants reported by Prof. Eaton as new to the "Berzelius Catalogue" of plants growing within thirty miles of Yale College, I was reminded that I might give a similar list of those that I have found in this section of the circle.

Reseda Luteola, L., is given in the Catalogue as lost. I have since observed it in its old habitat, and also in another locality.

I am credited with finding *Viola pedata*, L., var. *bicolor*, Gray, but this is a mistake, it was var. *alba*. I have never seen the var. *bicolor* growing wild.

Erodium cicutarium, L' Her., grows at Stony Brook.

Polygala fastigiata, Nutt., grows at Atlanticville, beyond the limits of the Catalogue.

Amorpha fruticosa, L. Of this, reported as lost, I have found several specimens again.

Ammania humilis, Mx., is common on Long Island.

Hydrocotyle umbellata, L., is common on Long Island.

Galium boreale, L., I observed on the shore of the Housatonic, below Cornwall Bridge, Ct., in 1875, but probably not within the limits of the Catalogue.

Eupatorium hyssopifolium, L., is very common on Long Island.

Aster nemoralis, Ait., I have found in a sandy swamp near River Head.

Xanthium spinosum, L., formerly grew at Mt. Sinai, but I have not seen it for some years.

Achillea Millefolium, L., var. *roscum*, is common on Long Island.

Matricaria inodora, L., was formerly plentiful, but I have not seen it for several years,

Cirsium horridulum, Mx., is common on Long Island.

Vaccinium Oxycoccus, L., grows at one locality in Wading River.

Mentha aquatica, L., var. *crispa*, is found at Mt. Sinai.

Echium vulgare, L., is found at Port Jefferson.

Asclepias incarnata, L., (typical form) grows at Wading River.

Rumex maritimus, L., was found in abundance at Montauk Point in 1879. This is far beyond the limits of the Catalogue, but is interesting because it is new to the State of New York.

Amarantus viridis, L., is plentiful at East Hampton, though beyond the limits of the Catalogue.

- Callitriche heterophylla*, Ph., is common on Long Island.
Quercus palustris, Du Roi., is found at Manor, Long Island.
Cupressus thyoides, L., is common around River Head, where it takes the place of the red cedar.
Potamogeton hybridus, Mx. Wading River.
Potamogeton pusillus, L., var. *tenuissimus*. River Head.
Potamogeton perfoliatus, L. Northville and River Head.
Potamogeton gramineus, var. *gramineifolius*. River Head.
Spiranthes graminea, Lindl., var. *Walteri*. Wading River.
Liparis Læselii, Richard. Wading River.
Lachnanthes tinctoria, Ell., was found at Manorville this year by Hon. Isaac Coles, of Glen Cove.
Sporobolus serotinus, Gray. River Head.
Muhlenbergia sylvatica, T. & G. River Head.
Elymus Canadensis, L., is common on Long Island.
Panicum amarum, Ell., is common at Wading River, on the sound, and at River Head, on the bay.
Cystopteris fragilis, Bernh. In an old well at Rocky Point, and in a deep ravine at Wading River; not a dozen plants in both localities.

E. S. MILLER.

Additions to the Flora of Onondaga County, N. Y.—In spite of very adverse weather the Syracuse Botanical Club has made some botanical excursions during the past season, and very satisfactory ones too. We have found the following plants, which were entirely new to us:

Viola striata, Ait. (with cream-colored flowers); *Corydalis flavula*, Raf; *Atriplex hortensis*, L., found by Mrs. Charles Barnes by the road near High Bridge; *Aplectrum hymale*, Nutt. (with bright lemon-colored flowers); sterile plants of *Humulus Lupulus*, L.; *Polygonum Virginianum*, L.; *Quercus macrocarpa*, Mx.; *Lappa officinalis*, Allioni, (with white flowers); *Erythraea Centaurium*, Pers.; a sedge not identified; *Aster linifolius*, L.; *Aster puniceus*, L. (with rose-colored flowers); *Aster simplex*, Willd.; *Aster puniceus*, L., var. *vimineus*, Gray; *Helianthus decapetalus*, L.; *Asclepias phytolaccoides*, Pursh; and *Cladium mariscoides*, Torr. Mr. Beauchamp sent to us from Baldwinsville, *Spergularia rubra*, Presl., var. *campestris*, Gray. Besides the above we have collected many species not represented in our county herbarium.

Syracuse, N. Y.

MARY OLIVIA RUST.

Flora of Sam's Point.—The note by Mr. Britton in the last number of this journal, describing the botanical characteristics of Sam's Point, omits mention of some peculiarities which I noticed during a visit to this lovely spot in a most beautiful country, about the middle of September of the present year. I there saw, for the first time, the American mountain-ash (*Pyrus arbutifolia*), and was impressed with its splendid appearance. The European species (*P. aucuparia*) is cultivated in Washington and vicinity, and I have often admired the beautiful orange-colored berries; but our native species far sur-

passes it. In fact, I have never seen anything outside the tropics which, in my opinion, would compare with the large masses of deep scarlet berries displayed by *P. arbutifolia*. The species was not abundant, but was noticed in several places, growing usually in clefts of rocks, and forming a tall shrub of 5-10 feet in height. It was observed in cultivation at two places along the road leading to the Point, in one instance forming a tree some 20 feet high. Another peculiarity of the vegetation of the Point which Mr. Britton omits to mention is the remarkable form assumed by the few hemlock-trees which grow there. One was noticed which had an elevation of not more than six feet, but which expanded a rod or more (I write from memory, no measurements having been taken), the dense flat top supported on a comparatively massive straight trunk a foot or more in diameter and several feet in height. I was told of a tree (said to be a pine), of similar shape, growing at the mouth of the "ice cave" which expanded more than 30 feet, although no taller than the one just described.

ROBERT RIDGWAY.

Teratological Notes.—In the BULLETIN of July, last year, I recorded the fruiting in my garden of an *Arisema triphyllum* with twin spadices. I have this last summer received from my brother, Professor L. W. Bailey of Fredericton, New Brunswick, Canada, who was ignorant of my previous observation, a specimen in the same condition. The flowering portion is simple, and so is the constricted neck, but above, the club-shaped appendages are distinct. Of these, one is taller than the other. The discoverer does not indicate any change in the surrounding spathe.

I have an English walnut with three cotyledons. This reminds me to say that after sending my note on *Ipomœa* (present volume, page 82), I found one in my yard with three perfect cotyledons.

W. W. BAILEY.

Botanical Notes.

The Flora of the Country Bordering the Rio Grande, in Chihuahua and Texas.—In a paper read before the New York Academy of Sciences. Dr. Newberry says:

The country bordering the Rio Grande, in Chihuahua and Texas, is nearly destitute of trees, a feature which marks the aridity of the climate; yet, in certain localities, as on the bottom lands of the Rio Grande and Rio Concho, a vigorous and somewhat varied forest-growth was found at the advent of the whites. No better illustration of the relation between the kind of vegetation and the water supply in a country can be found than that afforded by the luxuriant growth of trees of several kinds along the Cibola in the Chinati Mountains, Texas; while on all sides this oasis is surrounded by an apparently boundless grass-covered prairie, where the rain-fall is inadequate for trees. On the mountain-summits, south of the Rio Grande is a sparse growth of piñon (*Pinus edulis*) and evergreen oak (*Quercus Emoryi*.) The lowlands in certain localities, over thousands of acres, are thickly set with mesquite (*Prosopis glandulosa*), here a

strong, spreading shrub, never a tree, but with roots disproportionately large, composed of very dense tissue and furnishing a large amount of excellent fuel. Along the arroyos, cottonwood may occasionally be seen, either the narrow- or the broad-leaved form (*Populus monilifera* or *P. angustifolia*), and more commonly the hackberry (*Celtis occidentalis*), and the nopal, the little black walnut (*Juglans rupestris*), the Mexican buckeye (*Ungnadia speciosa*), and the guayacan (*Guaiacum Coulteri*). The drier portions, especially the gravel terraces bordering the Rio Grande, are frequently covered with the creosote-plant (*Larrea Mexicana*) and *Fouquieria splendens*. The latter forms a cluster of fifteen or twenty canes, ten or twelve feet high, springing from the same root and bristling with spines an inch or more in length, of which the bases are in contact. Usually it is without leaves, and seems as though dead; but, for a brief interval in the rainy season, it is covered with small, crowded, obovate leaves, and from the summits of each stem springs one or more spikes of brilliant crimson flowers.

Among the shrubs which form the "chaparral" or thickets, the *Holacantha* is the most conspicuous, and *Salazaria* the most interesting. The former, as its name implies, is a mass of thorns, which are often as large and strong as those of the honey-locust. The branches and spines are covered with a green epidermis, which performs the functions of leaves, and, in the spring, these bear bunches of yellow flowers similar to those of *Berberis*. The *Salazaria* is a labiate allied to *Scutellaria*, and the seed is inclosed in a balloon-like capsule, similar to that of the balloon-vine (*Cardiospermum*), also found here, and having the same function, namely, dissemination by the wind. Two species of *Acacia* and one of *Berberis* (*B. trifoliata*), all spiny, help to make the chaparral as nearly impenetrable as the thickets of cactus further west. We are here fairly within the confines of the cactus country, but not in its heart. Many species differing much in habit are constantly in sight—the "nopal," an *Opuntia*, being the most common, one species growing in a mass ten feet or more in height, with each leaf-like subdivision of the stem a foot in diameter. Though covered with spines, this plant is largely eaten by cattle, and nothing is more common than to see a patch of it trampled down, half eaten, and the flattened stems notched by semicircular bites. One species or variety of *Opuntia*, growing abundantly in Chihuahua, is of a deep purple color, which makes it conspicuous and often ornamental.

The most striking feature in the botany of this region is formed by the century-plant and its allies, other species of *Agave*, *Habranthus* and *Dasyllirion*, and the yuccas. In many places these are the only plants attaining any large size, and are very numerous, scattered over the plains and slopes of the mountains; the plants not crowded, but separated by intervals of a few feet, which are occupied with a luxuriant growth of gramma grass. The yuccas belong to four species, or three species and two varieties, *Yucca angustifolia* and *Y. baccata*. Of these, two rise to the height of five to fifteen feet, with trunks from six to twelve inches in diameter, the crowded, radiating leaves crowning the summit in a round or oval mass, six feet or more

in diameter, the old leaves hanging perpendicularly and forming a peculiar thatch around the trunk and extending to the ground.

The century-plant is in Chihuahua represented by a variety with shorter and broader leaves than that commonly cultivated. From the centre of the tuft, the flower-stalk rises from 10 to 25 feet in height, composed of woody tissue and standing some years after bearing flowers. These persistent flower-stalks, crowning the ridges and visible for miles, give a peculiar aspect to the scenery. The century-plants are, however, nowhere as numerous as the species of *Dasyllirion*, with which they are associated, and which do not die with the effort of florescence. Further south, the agave supplies from its sweet juice the material from which an intoxicating drink is produced. In this region, however, an alcoholic beverage is obtained from the "sotol" (*Dasyllirion Texanum*), which, from its abundance and the use made of it, deserves a prominent place among the economical plants of the country. Hundreds of thousands of acres are covered with this sotol, and it would seem that it might be much more largely utilized than it is for the manufacture of alcohol. The leaves are three to three and a half feet long by one a half inches wide at the base, straight, flat, and garnished on either side with strong recurved hooks. The color is yellow-green, and the leaves are very numerous. From the centre rises, at a certain stage of growth, a woody flower-stalk, ten feet high and at the base as large as one's arm. The trunk rises but a few inches above the ground and is completely concealed. The top of this trunk, composed of the closely imbricated leaf-bases, which are broad, yellow, shining, succulent and sweet, with a pulpy mass at the centre, containing much saccharine matter, raw, or better roasted, is palatable and nutritious; so much so, that in the country where it grows it is said the Indians never really suffer for want of food, as this affords them an abundant if not varied aliment.

In the preparation of sotol whisky—a liquid called *mescal*, as is also that made further west from other plants—the portion of the plant which has been described is trimmed so as to resemble a head of cabbage, then roasted and fermented, the product of the vinous fermentation being distilled in the ordinary way. For roasting the sotol, a pit is dug, some ten feet in diameter and four feet deep, lined with rude masonry. In this a fire is built, and when it has been burned down, the pit is filled with several hundred sotol heads. When roasted, they are chopped in pieces and fermented in vats.

Another interesting plant, the companion of the sotol, is the "lechuguilla" (*Agave heterocantha*), of which the leaves furnish a strong fibre, universally employed for ropes, sacks, etc., in Northern Mexico. This grows on the mountain slopes, generally at an elevation of about 4,000 to 5,000 feet, is common in all Northern Chihuahua, and especially abundant on the Chinati Mountains in Texas.

The Syracuse Botanical Club.—We are informed that, owing to ill health, Mrs. Grifford has been obliged to resign the position of Corresponding Secretary of the Syracuse Botanical Club, and that Mrs. S. M. Rush has been elected to fill the vacancy.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.]

New York, December, 1883.

[No. 12.]

New Western Plants.

BY EDWARD LEE GREENE.

DRABA ASPRELLA.—Roughish-pubescent with short stiff hairs, which are either simple, or parted above the middle into from two to four divaricate branches; stems a span high, from a biennial or perennial root, leafless except at base; petals showy, yellow; pedicels .5 inch long, divaricate, bearing silicles of one-third their length, which are ovate-oblong, scarcely compressed, and tipped with a long style.

Lynx Creek, Northern Arizona, May 31, 1883. H. H. Rusby. With the habit of *D. Mogollonica*, Greene (*Bot. Gaz.*, v., 157), but very different. The peculiar pubescence covers the leaves, stem and pedicels throughout, extending in shorter and simple hairs to the long-oval pods. I am informed by Dr. Gray that this was collected near Prescott by Dr. Edward Palmer in 1876, and is his No. 565; though his specimens were in flower only, and therefore the species was left unnamed and undescribed.

POLYGALA RUSBYI.—Hoary-pubescent, 2-6 inches high; stems numerous, much branched, spineless; leaves ovate to ovate-oblong, acute or obtuse, one-half inch long, sessile, or nearly so; bracts scarious; pedicels 2-4 lines long; sepals pubescent and ciliate, the outer slightly saccate at the base; wings oblong, flesh-colored, 4-5 lines long; lateral petals linear, a little longer than the yellow keel, which has a long, nearly straight beak, a little widened at the apex; young capsules broadly obovate, emarginate, nearly smooth; seed not seen.

Collected near Prescott, Arizona, April 1883, by H. H. Rusby.

Near *P. subspinos*a, Wats., but more pubescent, wholly spineless, and with a different beak. Mr. Watson informs me that it was collected by Dr. Palmer in 1870 and in 1876, and that it is referred to in the original description of *P. subspinos*a as a more pubescent form of that plant.

COTYLEDON RUSBYI.—Acaulescent, glabrous; rosulate leaves obovate-oblong, sharply acuminate, 1 inch long; flowering-branches scape-like, 3-6 inches high, leafless, but with some scattered, subulate bracts; pedicels slender, 3 lines long; sepals oblong, less than half the length of the petals; petals lanceolate, acuminate, 3-4 lines long, united only near the base, nearly coral-red.

San Francisco Mountains in South-eastern Arizona; collected by the writer in 1880, and also by Mr. H. H. Rusby in 1881. A small species.

ENOOTHERA (CHYLISMIA) DIVARICATA.—Rather short and apparently 2-3 feet high, the stem and branches hirsute; lyrate leaves hoary; calyx-tube funnellform, a line or two long; tips of the lobes free; petals white or rose-color, 4-6 lines long; capsules linear, 2-3

inches long, divaricately spreading on bracted pedicels 1-3 lines long, surrounded by a narrow, minutely crenulate margin.

A California plant, but the exact locality unknown. The only specimen was detected in a bundle of "*Crucifera*" in that portion of the Geological Survey collection which was deposited in the University. The species is particularly well marked; and, by its narrowly winged seeds, is related to *Æ. pterosperma*, Watson, but in size and habit it is more like *Æ. brevipes*, Gray. The horizontally spreading, or a little deflexed capsules are peculiar, and suggest the specific name.

BIGELOVIA TRIDENTATA.—Shrubby, glabrous and glutinous; foliage densely fascicled and clothing thickly the rigid branches; leaves an inch long, coriaceous, narrowly cuneate, 3-toothed, or 3-cleft at the apex, the teeth or short lobes acute; heads short-peduncled, three-fourths of an inch long, racemously or thyrsoidly arranged toward the ends of the branches; involucre scales in many ranks, with short, acute, more or less hispid-ciliolate and squarrose-spreading tips; akenes pubescent.

Mixed with *Bigelovia Menziesii* in the Cedros Island collection of Dr. Veitch. But it is so distinct from that species, both in general aspect as well as in technical character, that it is strange they should have been confounded. It is remarkable among *Bigelovia* for its densely fascicled foliage, its hard, woody stems being hidden by the abundance of leaves. Its inflorescence is nearly that of *Applopappus squarrosus*, to which it has a stronger likeness, than to any *Bigelovia*.

BIGELOVIA ACRADENIA.—Shrubby and much branched, a foot or more high, glabrous and very glutinous; leaves narrowly oblanceolate, rigid, entire, an inch or more long; heads corymbose clustered, 3-4 lines long, 6-10-flowered; involucre narrowly campanulate, its scales regularly imbricated, their tips obtuse and bearing a conspicuous resiniferous gland beneath the epidermis; akenes turbinate, very silky.

On the Mojave Desert, collected by Dr. Parry and the writer, September, 1881. Closely related to *B. Menziesii*, but of very different habit, being diffusely branched, and forming compact, rounded, broomy tufts. The heads are only half as high as those of that species, and have but half as many flowers, and the tips of the involucre scales, distended and filled with resin, are peculiar.

ANTIRRHINUM KELLOGGII.—A foot or two high, glabrous and slightly glaucous, not at all glandular or viscid; leaves broadly lanceolate, 1-1.5 inch long, tapering to a short petiole; peduncles axillary, slender, twice the length of the leaves, but not prehensile; sepals lanceolate, 2 lines long; corolla .5 inch long, merely gibbous at base.

Summit of the Sierra Nevada; Dr. H. Kellogg, July 20, 1870. An alpine species, to come between *A. Kingii* and *A. strictum*. Though simple and slender, with very long peduncles, it does not appear to be a climbing species, and Dr. Kellogg notes that it grows near snow, in patches by itself. The single specimen collected is young and without fruit; but it indicates a very distinct and interesting species.

PENTSTEMON KLEEI.—Near *P. Rattani*, 1.5–2.5 feet high, ill-scented, light green, and not glaucous, glabrous up to the glandular pubescent, narrow thyrsus; leaves sub-coriaceous, rather remotely and sharply serrulate or denticulate, the radical ones lanceolate, the cauline ovate-lanceolate, cordate and even the lowest more or less connate-perfoliate; sepals oblong and obtuse; corolla lilac-purple barely .75 inch long, the tube equalling the calyx, the lobes short-oblong, very obtuse; sterile filament long-bearded on the upper side nearly half way down.

On the summit of Ben Lomond, the highest peak of the Santa Cruz Mountains, California. Collected by Mr. W. C. Klee in the month of June, 1883.

A New Genus of Sphæriaceous Fungi.

By CHAS. H. PECK.

NEOPECKIA, Saccardo.

Index

Perithecia carbonacea, subfragilia, superficialia sed subiculo copioso effuso semiimmersa, globosa, papillata, denique latiuscule pertusa. Asci octospori, elongati, copiose paraphysati. Sporidia didyma, fuliginea.

A genere *Amphisphæria* subiculi copiosi presentia differt, ab *Enchnosphæria* et *Eriosphæria* sporidiis perfecte didymis, fuliginis recedit. Genus inter Pyrenomycetes phæodidymos locandum, clarissimo mycologo C. H. Peck, speciei typicæ illustratori jure meritoque dicatum.

NEOPECKIA COULTERI (Peck) Sacc.—*Sphæria Coulteri*, Peck in Hayden's U. S. Geol. Survey, 1872, p. 792; *Enchnosphæria* (?) *Coulteri* (Peck) Sacc., Syll., Vol. ii., p. 207; *Lasiosphæria acicola*, Cooke, Grevillea, Vol. viii., p. 87, 1880. *Amphisphæria* (?) *acicola* (Cooke) Sacc. Syll., Vol. i., p. 727.

Perithecia .5^{mm}. diam., demum papilla amissa, perforata; asci, pars sporidifera 130–140=14–15; paraphyses copiosæ, filiformes; sporidia utrinque obtusiuscula, 20–28=9–10, intense fuliginea.

Habitu externo *Enchnosphæria Pinetorum* peraffinis, sed fructificatio prorsus aliena.—P. A. Saccardo.

The specimens on which this species was founded were collected near Yellowstone Lake, Wyoming Territory, by Prof. J. M. Coulter, to whom the species is dedicated. The fungus has since been collected on the Sierra Nevada Mountains, California, by Mr. C. G. Pringle. The type specimens of *Lasiosphæria acicola*, Cke., are recorded: "On pine-leaves, Rocky Mountains." They are credited to Dr. Lyall.

The genus, as already stated by Professor Saccardo, is distinguished from *Amphisphæria* by its subiculum, and from *Enchnosphæria* and *Eriosphæria* by its colored spores; from *Rosellinia* by the unisepate spores.

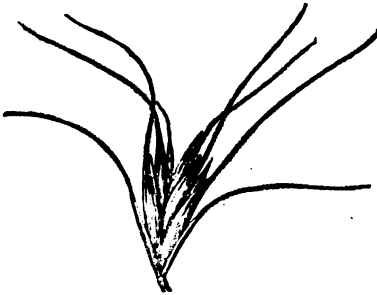
The subiculum creeps over the dead leaves and twigs, binding them together and forming a soft, tomentose, brown or reddish-brown stratum, in which the numerous perithecia are involved.

These are more or less closely gregarious, rather fragile and at first furnished with a distinct and usually naked apical papilla or ostium, which at length disappears, leaving the perithecium rather widely perforate. Sometimes the subiculum has a smooth or sub-membranous appearance as if collapsed from excessive moisture, and then the perithecia are more prominent, but still they retain their unpolished tomentose surface. The asci are cylindrical and obtuse at the apex. The spores are oblong or oblong-elliptical, uniseriate, uniseptate, colored, constricted at the septum, .0009 to .0011 inch long, .00035 to .00045 inch broad. In some conditions they appear as if involved in a thin colorless mucus.

New Species of Grasses.

By GEO. VASEY.

AGROPYRUM SCRIBNERI.—Culms densely tufted, geniculate and decumbent near the base, one to one and a half foot high, rather slender. Leaves very short, two or three on each culm, the upper sheath twice or thrice as long as the blade, ligule obsolete, blade 1-1.5 inch long, 1-2 lines wide, rigid, attenuate-pointed. Spike 2-3



inches long, closely or sometimes lax-flowered, but the spikelets always longer than the internodes of the spike. Spikelets 3-6-flowered, outer glumes linear-lanceolate, 3-5-nerved, extended above into a long point (.5-1 inch), smooth except the hispid point. Flowering-glumes oblong-lanceolate, the base 4-5 lines long, smooth, about 5-nerved, sometimes slightly bidentate at the

apex, the midnerve extended into a strong, spreading or recurved hispid awn. Palea equalling the flowering-glume, acute, except on the hispid marginal nerves.

This plant, although in the spike resembling *Agropyrum caninum*, differs notably in its tufted habit, its low size and smooth, rigid, sometimes glaucous leaves. It is perhaps the *A. caninum*, var. *Gmelini*, Ld. Mr. Scribner remarks that it is found only high up on the mountains near the timber-line, growing in scattered tufts in crevices and among the loose rocks, recognized by its low, usually prostrate stems, short leaves, with somewhat inflated sheaths, and long, divergent, awned spikes. It was collected by Mr. C. G. Pringle in the Sierras in 1882, altitude 9,500 ft., and distributed as *Triticum caninum*, L.? It was collected the past season in Montana by Mr. F. L. Scribner, to whom I take pleasure in dedicating it.

SPOROBOLUS BUCKLEYI.—Culms 2 ft. high, compressed below, as are the smooth, striate sheaths; ligule a short, ciliate fringe, also a ring of short hairs externally at the top of the sheath.

Panicle 9-10 inches long, oblong, very open, lax and graceful, branches erect, mostly single, occasionally in twos, capillary, the lower

ones about 4 inches long, gradually shorter above, the lower third naked, the branchlets short (mostly less than one-half inch), numerous, loosely few-flowered, somewhat recurved.

Spikelets purplish, less than a line long; the outer glumes unequal, acute, the lower one one-third shorter than the upper, which is a little shorter than the flower and scabrous on the keel; flowering-glume lanceolate, acute, smooth, except on the keel near the apex; palea nearly equalling its glume.

This is a well marked species, having somewhat the general appearance of *Lepidochloa mucronata*, with a more graceful panicle. It grows in Texas, and was discovered by Dr. S. B. Buckley, after whom it is named.

Contributions toward a List of the State and Local Floras of the United States

THE WESTERN STATES.*

INDIANA.

The Trees of Indiana. By Thomas B. Elliott. (D.)

In Trans. Indianapolis Acad. Sci. 1872.

Catalogue of the phænogamous and vascular cryptogamous Plants of Indiana. By J. M. and M. S. Coulter and C. R. Barnes. (B.) 8vo, pamph., pp. 38. Crawfordsville, 1881.

Catalogue of the Flora of Central-Eastern Indiana (alpine or elevated district of the State). By A. J. Phinney, M.D. (B.)

In 12th Report of the State Geologist. Indianapolis, 1883.

(Embraces the Counties of Delaware, Randolph, Jay and Wayne).

Jefferson County.

Manual of the Botany of Jefferson County. By A. H. Young. (B.)

In 2nd Ann. Rep. Geol. Survey. Indianapolis, 1871.

Partial List of the Flora of Jefferson County. By John M. Coulter. (B.)

In 6th Ann. Rep. Geol. Survey. Indianapolis, 1875.

Catalogue of phænogamous and vascular cryptogamous Plants found growing wild in Jefferson County. By Charles R. Barnes. (A.)

To which is added:

Clark County.

A List of Plants growing in Clark County, but not found in Jefferson. By John T. Baird. (A.)

8vo, pamphlet, pp. 9. Madison, 1878.

Gibson and Posey Counties.

Flora of the Lower Wabash Valley, below the mouth of the White River. By J. Schneck, M.D. (B.)†

In 7th Ann. Rep. Geol. Survey. Indianapolis, 1876.

(Additions by the author in Botanical Gazette, Vol. ii, 1877.)

Wayne County.

List of Ferns, Mosses, Hepaticæ and Lichens collected in Wayne County. By Mrs. Mary P. Haines. (A.)

* Continued from page 105.

† Also gives localities in one or two Illinois counties.

In 8th, 9th and 10th Ann. Reps. Geol. Survey, p. 235. Indianapolis, 1879.

ILLINOIS.

Contributions towards the Botany of the States of Illinois and Missouri. By L. C. Beck, M. D. (D.)

In Amer. Journ. Sci. and Arts, i series, Vols. x., xi. and xv., 1826 and 1828.

Catalogue of a Collection of Plants made in Illinois and Missouri by C. A. Geyer. By George Engelmann, M. D. (C.)

In Amer. Journ. Sci. and Arts, i series, Vol. xlv., 1844.

A Catalogue of Illinois Plants. By I. A. Lapham.

8vo, pamphlet, pp. 60. 1857.

The Trees and Shrubs of Illinois. By Fred. Brendel, M. D. (D.)

In Trans. Ill. Agric. Soc., Vol. iii., 1858-1859.

Catalogue of the phænogamous and vascular cryptogamous Plants of Illinois, native and introduced. By H. N. Patterson. (B.)

8vo, pamphlet, pp. 54. Oquawka, 1876.

List of Illinois Lichens. By H. Willey. (B.)

In Botan. Gazette, Vol. ii. Logansport, 1877.

Lichens of Illinois. By E. Hall and J. Wolf.

In Bull. No. 2, Ill. State Lab. Nat. Hist., 1878.

Lichens of Southern Illinois. By H. Willey. (A.)

In Botan. Gazette, Vol. iii., Logansport, 1878.

Notes on the native Trees of the Lower Wabash and White River Valleys, in Illinois and Indiana. By Robert Ridgway. (C.)

In Proc. U. S. Nat. Museum, June 12, 1882.

Cook County.

Flora of Chicago and vicinity. By H. H. Babcock. (B.)

In the Lens, Vols. i. and ii., Chicago, 1872-1873.

Henderson County.

A List of Plants collected in the vicinity of Oquawka, Henderson County, Ills. By Harry N. Patterson. (A.)

8vo, pamphlet, pp. 18. Oquawka, 1874.

Peoria County.

Flora Peoriana: A Catalogue of Plants observed and collected in the vicinity of Peoria, Ill., 1852-1877. By Fred. Brendel. (A.)

In the Pharmacist, Vol. xv., Nos. 7 and 8, Chicago, 1882.

MICHIGAN.

Catalogue of the phænogamous and filicoid Plants collected on the Geological Survey of Michigan. By John Wright, M. D. (A.)

In Legislat. Rep. No. 23. Detroit, 1859.

Catalogue of the Plants collected by Wm. A. Burt in the primitive Region south of Lake Superior, in 1846. By Dennis Cooley. (B.)

In Jackson's "Lake Superior." Washington, 1849.

Catalogue of phænogamous and acrogenous Plants found growing wild in the lower Peninsula of Michigan, and the Islands at the head of Lake Huron. By N. H. Winchell. (B.)

In 1st Bienn. Rep. Progr. Geol. Survey. Lansing, 1861.

Catalogue of the flowering Plants of the southern peninsula of Michigan, with a few of the Cryptogamia. By N. Coleman.

Publ. by Kent Scientif. Inst. Grand Rapids, 1873.

Catalogue of Phænogamous and Acrogenous Plants found growing wild in Michigan. By Elmore Palmer, M. D. (A.)

8vo, pamph., pp. 16. Dexter, 1877.

Catalogue of the phænogamous and vascular cryptogamous Plants of Michigan, indigenous, naturalized and adventive. By C. F. Wheeler and E. F. Smith. (B.)

8vo, pamph., pp. 105. Lansing, 1881.

Washtinaw County.

Flora of Ann Arbor and vicinity. By Miss E. C. Almendinger.

In Proc. Ann Arbor Scientif. Assoc. 1876.

WISCONSIN.

Trees of Wisconsin. By P. H. Hoy.

Agric. Rep. 1852.

Localities of Plants collected in the North-western Expeditions of 1831 and 1832. By Douglass Houghton, M. D. (B.)

In Schoolcraft's "Narrative of an Expedition through the Upper Mississippi to Itasca Lake, the actual source of that River, in 1832.

Appendix. (Some of the localities given are in Minnesota.)

Plants of Wisconsin. By I. A. Lapham. (A.)

In Trans. Wis. State Agric. Soc. 1852.

(Additions by I. A. Lapham in Trans. Wis. State Agric. Soc. 1860.)

Additions to the Flora of Wisconsin. By T. J. Hall.

Pamphlet. 1860.

Systematic Catalogue of the Plants of Wisconsin and Minnesota.*

By C. C. Parry, M. D. (C.)

In Owen's Geol. Surv. Wisconsin, Iowa and Minnesota. Philadelphia, 1852.

Catalogue of exogenous, endogenous and acrogenous Plants of Wisconsin. By G. D. Swezey. (A.)

32mo, pamphlet. Beloit, 1877.

Catalogue of the phænogamous and vascular cryptogamous Plants of Wisconsin. By Goodwin D. Swezey. (B.)

In Geology of Wisconsin, Survey of 1873-1879, Vol. i.

A partial List of the Fungi of Wisconsin, with Descriptions of new Species. By W. F. Bundy. (D.)

In Geology of Wisconsin, Survey of 1873-1879, Vol. i.

List of cryptogamous Plants from the region of Lake Superior. By Charles J. Sprague. (A.)

In Proc. Bost. Soc. Nat. Hist., Vol. vi.

Milwaukee County.

Catlogue of the Plants found in the vicinity of Milwaukee. By I. A. Lapham. (A.)

24 mo, pamphlet, pp. 12, Milwaukee, 1836; and 24 mo, pamphlet, pp. 24, Milwaukee, 1838.

W. R. G.

N. L. B.

* See BULLETIN x., 103.

A New Species of Frullania.—*Frullania Pennsylvanica*, n. sp.*—

Dioica. Caulis e basi amphigastriorum repens, dichotomo-ramosus; folia imbricata, plana, ovata, mucronata, rarius obtusa, integerrima, cellulis valde chlorophyllosis, marginem versus minoribus basi valde dilatatis, plus minusve regulariter hexagonis, parietibus validis; incrassatio angulosa subnulla. Auricula denudata, e margine folii oriunda, oblique a caule distantia, majuscula, cucullato-rotunda, sub orificio leniter contracta, ultra folii marginem demissa; amph. subimbricata, plana, late ovata, caulem excedentia, profunde partita, sinu angusto obtuso, laciniis ovatis, longe acuminatis, conniventibus; amenta mascula elongata, laxe foliosa, in ramulis parvis lateralibus, bracteis complicatis, lobis subæqualibus ovatis obtusis; perichætia in ramulis longioribus apicalia, sæpe ad basin dichotomiæ, fol. inv. complicata, integerrima, lobulis (ventrale minori) ovatis, acuminatis, basi valde angustatis; amph. invol. magna, carinato-concava, profunde partita, laciniis ovatis, longe apiculatis, integerrimis vel uno alterove dente munitis. Perianthia desunt.

Hab. in rupibus umbrosis, Stony Creek, Carbon County, Pennsylvania. Leg. E. A. Rau.

The plant is of about the size of *Frullania dilatata*, but the color is a dull olive-green. The tufts are depressed, and creep over rocks or over other Hepaticæ. According to the diagnosis of Mr. Austin's *F. Leana*, our plant must stand near it. I am not, however, in possession of the latter plant, though I do not doubt that they are two distinct species.

Leipzig, Germany.

F. STEPHANI.

Gerardia tenuifolia, Vahl, **parasitic**.—To my knowledge, only those species of *Gerardia* that belong to the section *Dasystoma* (such as *G. flava* and *quercifolia*) have thus far been proved to be parasitic (cf. Gray, Struct. Bot., p. 38, and Flora of N. A., p. 291). I have recently found that *Gerardia tenuifolia*, Vahl, section *Eugerardia*, has its roots amply provided with haustoria, the structure of which I hope to be able to describe at some future time.

Hoboken, December, 1883.

JOS. SCHRENK.

Note on Abutilon.—The involucre, so common in *Malvaceæ*, is, as every one knows, omitted in *Abutilon*, which, however, retains an interesting reminiscence of it in the joint seen in the peduncle some little distance below the flower. To-day one of my students showed me a specimen bearing one minute bract at this joint in the *Abutilon striatum* of the conservatories.

Providence, R. I.

W. W. BAILEY.

Pinus rigida in Minnesota.—In my note on *Pinus Banksiana*, incidental reference was made to *Pinus rigida*. I saw but young trees without cones in these outskirts of the forests' westward march. Prof. Sargent, who is very familiar with the forestry of that region, kindly suggests that the trees were of *Pinus resinosa*—the former species not extending so far.

THOMAS MEEHAN.

* Reproduced, at the request of the author, from *Hedwigia*, No. 10, 1883.

Melanthium latifolium, Desrouss, has been found in New Jersey. It was collected on a field excursion of the Club at Swartswood, Sussex Co., and first noticed by Mr. Wm. Bower, growing on a dry limestone ledge in open woods. A single flowering specimen was seen among numerous sterile plants, and this was fully four feet high, the panicle of greenish-brown flowers and half-ripened pods being two feet long and one foot in width. The leaves were all borne on the lower part of the stem and were eight inches long by two wide.

N. L. BRITTON.

Dioclea Boykinii.—I found this plant while collecting in S. Arkansas in 1881, but, unaware of its rarity, I put two or three specimens only in my hand-press, and sent those to Cambridge to Dr. Gray, from whom I learn that the species is so rare that a very few specimens only are known in the herbaria of the country. I propose to visit the locality next summer and collect enough for everybody, providing I get enough subscribers for the species to pay my expenses—my time being thrown in for the good of science.

Those who desire specimens should send their subscriptions to me as early as possible.

Fayetteville, Ark.

F. L. HARVEY.

The Notholæna Lemmoni has been successfully grown during the past year in the conservatory of the Golden Gate Park, San Francisco, and in several other conservatories in the same city, and also in Oakland. It proves to be quite hardy and makes much larger fronds than in its habitat on the Santa Catalina Mountains. The fronds are 12-15 inches high and 2 inches broad, and the broad, dark border of fruit contrasts very finely with the silvery whiteness of the powder beneath. It is becoming a very popular fern.

Oakland, Cal.

J. G. LEMMON.

Botanical Notes.

The Continuity of Protoplasm.—The subject of the continuity of protoplasm by means of delicate threads through the walls of vegetable cells attracted considerable attention at the meeting of the Biological Section of the British Association at Southport. Mr. W. Gardiner, who has examined fifty species of plants and found this continuity of protoplasm in all of them, pointed out that this fact places us in a position to obtain a clearer insight into such phenomena as the downward movement of a sensitive leaf upon stimulation, the influence of a germinating embryo upon the endosperm cells, and of the action of a tendril towards its support. Professor Hillhouse suggested that the protoplasmic threads may serve to transmit impulses from one cell to another and thus act somewhat like a nervous system. Dr. Carpenter remarked that there are forms in the animal kingdom in which the cell is never arrived at, but in which there is simply a continuity of protoplasm, so that the lower forms of the animal and vegetable kingdoms are here closely approximated to one another.

A Large Apple-tree.—In a note in the *Scientific American*, Rev. H. C. Hovey says:

While visiting an orchard near New Haven not long ago, the farmer, perceiving me to be taking notes as to the dimensions of his trees, told me that probably the largest apple-tree in the world was to be seen on the farm of Delos Hotchkiss, in Marion, Conn. I need not give the size as originally stated by my informant, which was, like most such matters, much exaggerated, for I have just had exact measurements taken, as follows:

Circumference of the trunk, near the ground.....	15 ft. 3 in.
“ “ “ three feet from ground.....	13 ft. 9 in.
“ “ “ at the forks.....	16 ft. 2 in.
“ “ 2 main branches, from.....	10 ft. 4 in., and 8 ft. 8 in.
“ of nine smaller branches, from.....	4 to 6 ft. each.
Height of tree.....	60 feet.
Diameter of tree top.....	104 feet.

A peculiarity of this tree is that it is what is termed “an alternate bearer,” five limbs bearing one year and four the next. The usual yield from the five limbs is about 85 bushels, although in a single instance it reached 110 bushels; and the four limbs vary from 35 to 40 bushels. The fruit is said to be excellent for winter use, though on this point I can only speak from hearsay.

The age of this venerable apple-tree is estimated at about 175 to 180 years. Curiously enough the patriotic old tree marked the centennial year by bearing fruit on *all* its branches, the first time it has been known to do so in its life, and it has continued to do so down to the present time. Some of the limbs are now dying, others are broken down, signs of decay appear in many places, and it is thought that this noble specimen of *Pyrus malus* will soon be numbered among the things of the past.

Botanical Literature.

Catalogue of phanogamous and vascular xryptogamous Plants of Worcester County, Mass. By Joseph Jackson. 8vo, pamph., pp. 48. Published by the Worcester Natural History Society.

Mr. Joseph Jackson has for some years given assiduous attention to the collection and study of the plants of Worcester County, Mass., and has now embodied the results in the form of this neatly-printed *Flora*. Among the cryptogams it includes only the ferns, equisetaceæ, and lycopods, The mosses, lichens and fungi would of course greatly extend it, and we hope the enterprising author will now give his attention to these.

The Worcester County Natural History Society, under whose auspices the publication is issued, appears to be doing excellent work in many directions.—W. W. B.

The Grasses of the United States: Being a synopsis of the Tribes and Genera, with a Description of the Genera, and a List of the Species. By Dr. Geo. Vasey. 8vo, pamph., pp. 47. Washington: Government Printing Office, 1883.

In the words of the author this “paper is an attempt to give a systematic synopsis of our grasses so far as known to the present time, with a description of the genera and a list of the species. Our

knowledge of some species is yet imperfect, and one object of this paper is to awaken such interest in the subject as may lead to further study and investigation of the same.

"The synopsis of the tribes and genera is chiefly a translation from the recently published *Genera Plantarum* of Messrs. Bentham & Hooker. The characters have been drawn up very briefly, but, it is hoped, with sufficient fulness to lead to the intended result. In drawing the characters of the genera the best authors have been consulted, a careful examination of specimens has been made, and the nomenclature conformed to the most recent views of floral structure."

Catalogue of the Flora of Oak Island, Revere, Mass.: with Notes. By Herbert A. Young. 8vo, pamph., pp. 19. From the *Bulletin* of the Essex Institute). Salem: Peabody Acad. of Science, 1883.

Oak Island, whose flora is here catalogued, is a slight, tree-covered elevation of land hardly reaching more than three or four feet above the surrounding salt-marsh, within the limits of the town of Revere, Mass., and just a few rods beyond the inlet that separates that town from the town of Saugus in Essex County. The entire number of plant embraced in Mr. Young's list, which includes phænogams, ferns and mosses, is three hundred and sixty-two.

Early Botanical Explorers of the Pacific Coast. By C. C. Parry. 8vo, pamph., pp. 8. Reprint from the *Overland Monthly* for October, 1883. (From the author.)

Deutsche botanische Monatsschrift, Organ für Floristen, Systematiker und alle Freunde der heimischen Flora. Herausgegeben von Dr. G. Leimbach.

This is a new monthly botanical journal published by the well-known botanist, Prof. Leimbach of Sondershausen. It accords the first place to systematic botany and the physiology of plants, and then to biology, morphology, teratology, etc. It is to give elaborate, and, if necessary, well illustrated articles from the pens of the most eminent members of the botanical fraternity in all parts of the world, and will contain elaborate reviews of new works, as well as of the important articles that appear in the chief botanical journals of the world. The subscription price, \$1.50, is very low.—G. E.

Proceedings of the Torrey Club.—At a regular meeting of the Club Tuesday evening, Sept. 11, the chair was occupied by Prof. E. H. Day, and eighteen persons were present.

New Stations discovered on Field Days.—Prof. Hyatt reported North Yonkers as a station for *Cypripedium pubescens*, Swartz., and Tottenville, S. I., for *Asclepias variegata*, L., a plant new to the Island. Prof. Day stated that he had found *Senecio candidissima*, commonly known as dusty miller, spontaneous at Highlands, N. J.

During the excursion to Swartzwood, N. J., on Aug., 4th, *Melanthium latifolium*, Desrouss., a plant new to the local flora, was detected. The *Nelumbium* was found in flower. Prof. Day reported Waretown, N. J., as a new station for *Kosteletzkya Virginica*, Presl., and stated that *Althæa officinalis*, L., had been found in abundance by him at Sand's Point, L. I.,

Miss Knight remarked upon the mosses found in the dells of Wisconsin and announced the discovery by her of *Eustichium Norvegicum*, Br. Eu., in fruit,

Prof. Martin exhibited a pink variety of *Impatiens fulva*, Nutt., and an example of heterogamy in Indian corn.

At the regular meeting held Tuesday evening, Oct. 9th, the President occupied the chair and twenty persons were present.

Plants noted on Field Days.—Messrs. Wilber and Bicknell reported that they had found a white-rayed variety of *Aster Nova-Angliae*, L., at Van Cortlandt, N. Y. Mr. Hollick stated that he had found the var. *roseus* of the same species on Staten Island.

Dr. Britton gave Tottenville, S. I., as a station for *Trichostema lineare*, Nutt., a plant new to the Island.

Prof Hyatt remarked upon some of the more notable plants that had been observed by him during a trip between Cincinnati and Chattanooga.

Adventitious Leaves in Rhus.—Mr. Schrenk exhibited a specimen of *Rhus Toxicodendron*, L., in which the inflorescence was replaced by tufts of leaves. (The same change has heretofore been noted in the BULLETIN as occurring in three other species of the genus—*R. glabra typhina* and *copallina*.)

At the meeting of Tuesday evening, Nov. 13th, the chair, in the absence of the presiding officers, was occupied by Prof. Day. There were twenty-six persons present.

Teratological.—Mr. Brower exhibited a specimen of *Amorpha fruticosa*, L., with fasciated stem, and one of *Cocculus Carolinus*, D C., with polymorphous leaves.

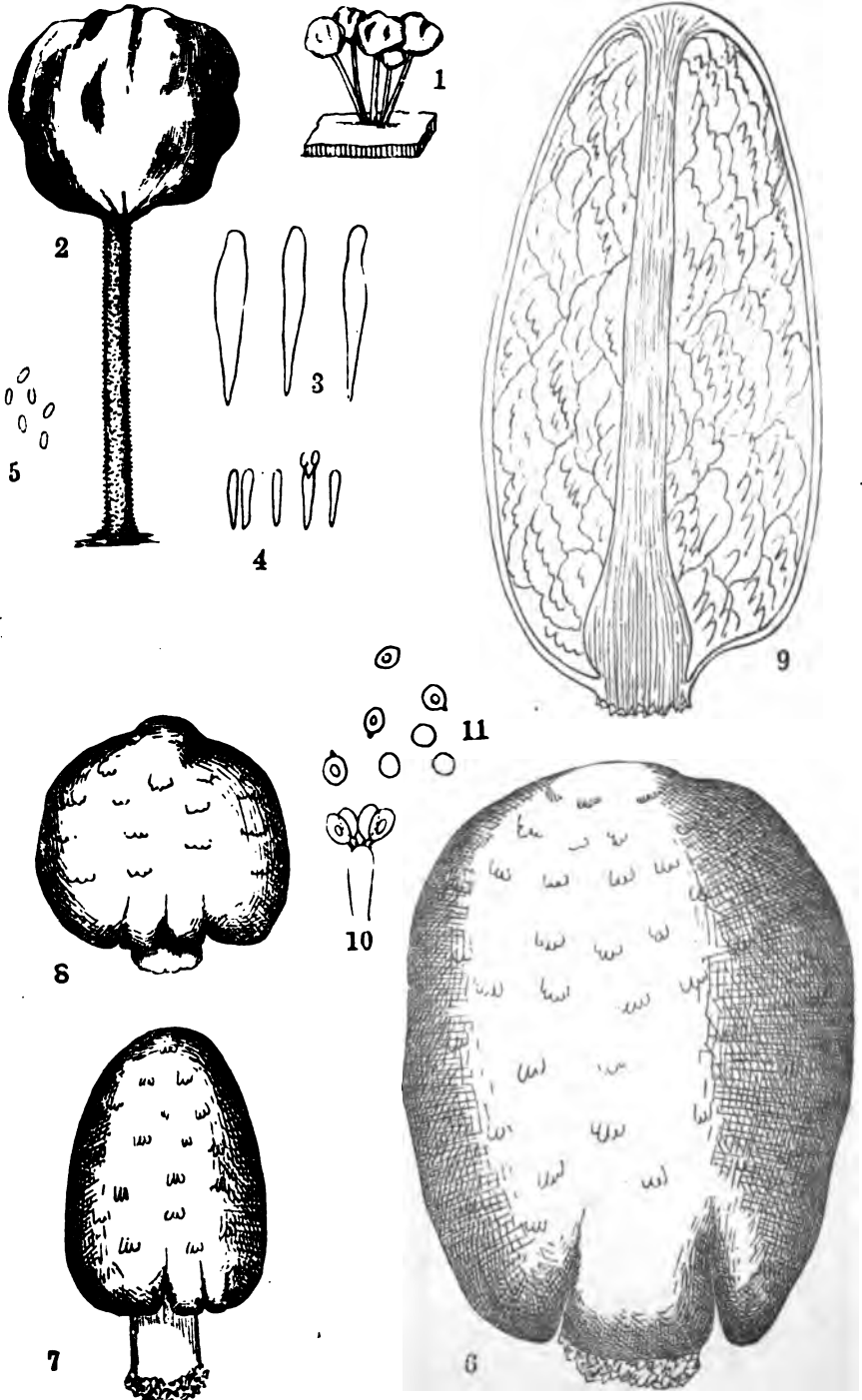
Mr. Schrenk remarked upon the structure of tuckahoe and upon the parasitism of *Gerardia tenuifolia*, Vahl (see page 132.)

Late-flowering Plants.—The following plants were reported by various members as being in flower for the second time this season: *Lonicera semipervirens*, Ait. (Miss Knight); *Viola sagittata*, Ait., *V. pedata*, L., and *V. primulaefolia*, L. (Mr. Hollick); *V. cucullata*, Ait. (Mr. Bicknell); and *V. lanceolata*, L. (Mr. Bisky). Dr. Britton remarked upon and exhibited under the microscope, specimens of *Protococcus (vulgaris?)* taken from the bark of trees in Brooklyn.

On motion the chairman appointed a committee of three (Messrs, Britton and Hyatt and Miss Knight) to consider a plan for forming a subsection of the Club for the study of physiological botany.

One person was elected an active member.

Correction.—*Pyrus arbutifolia* in Mr. Ridgway's note on pages 121 and 122 should of course read *P. Americana*. The error is so apparent that every reader of the BULLETIN has doubtless noticed and corrected it.



Figs. 1 to 5, *PHYSALACRIA INFLATA*.

Figs. 6 to 11, *SECOTIUM WARNERI*, Pk.



Fig. 1.



Fig. 2.



Fig. 3.



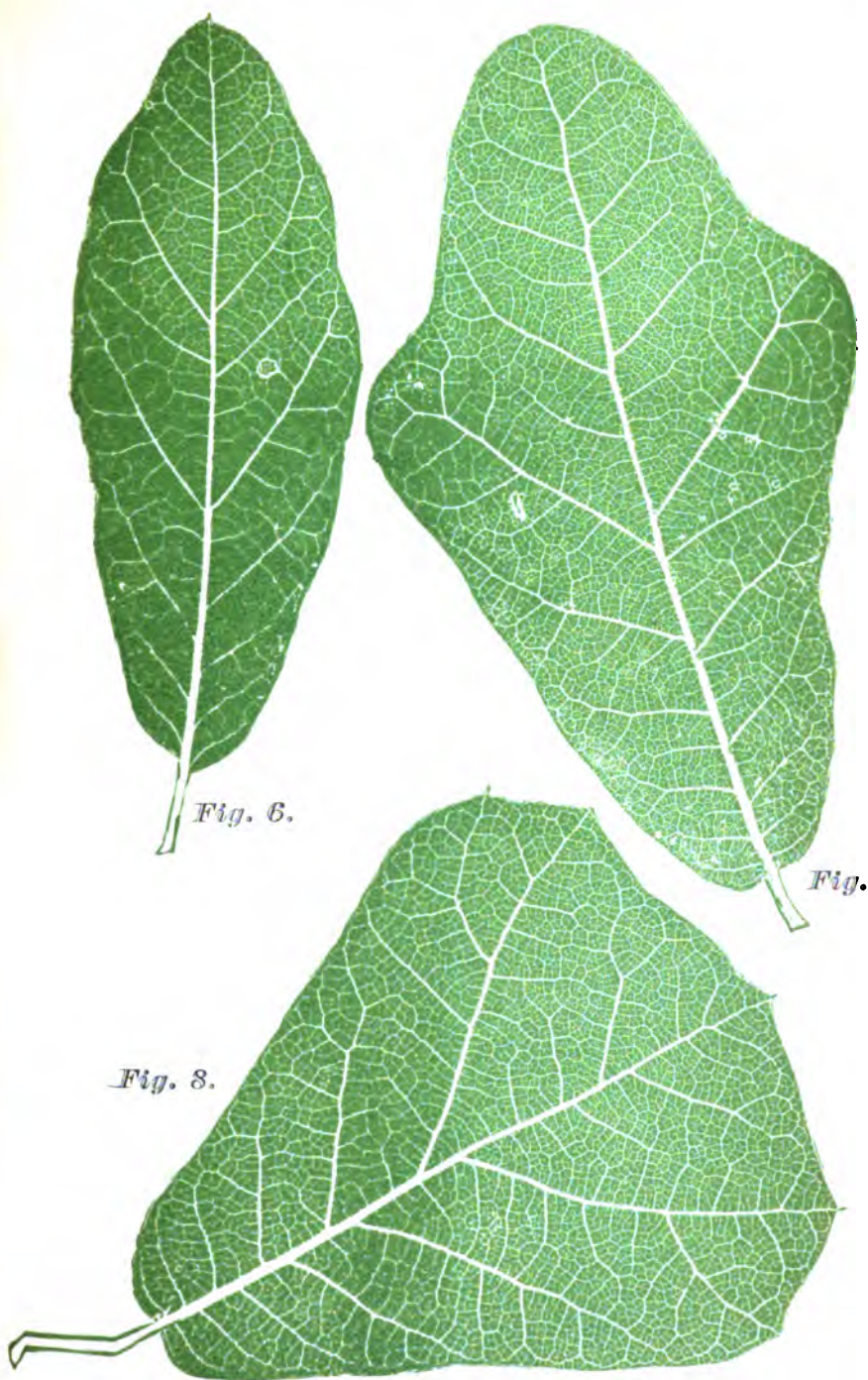
Fig. 4.



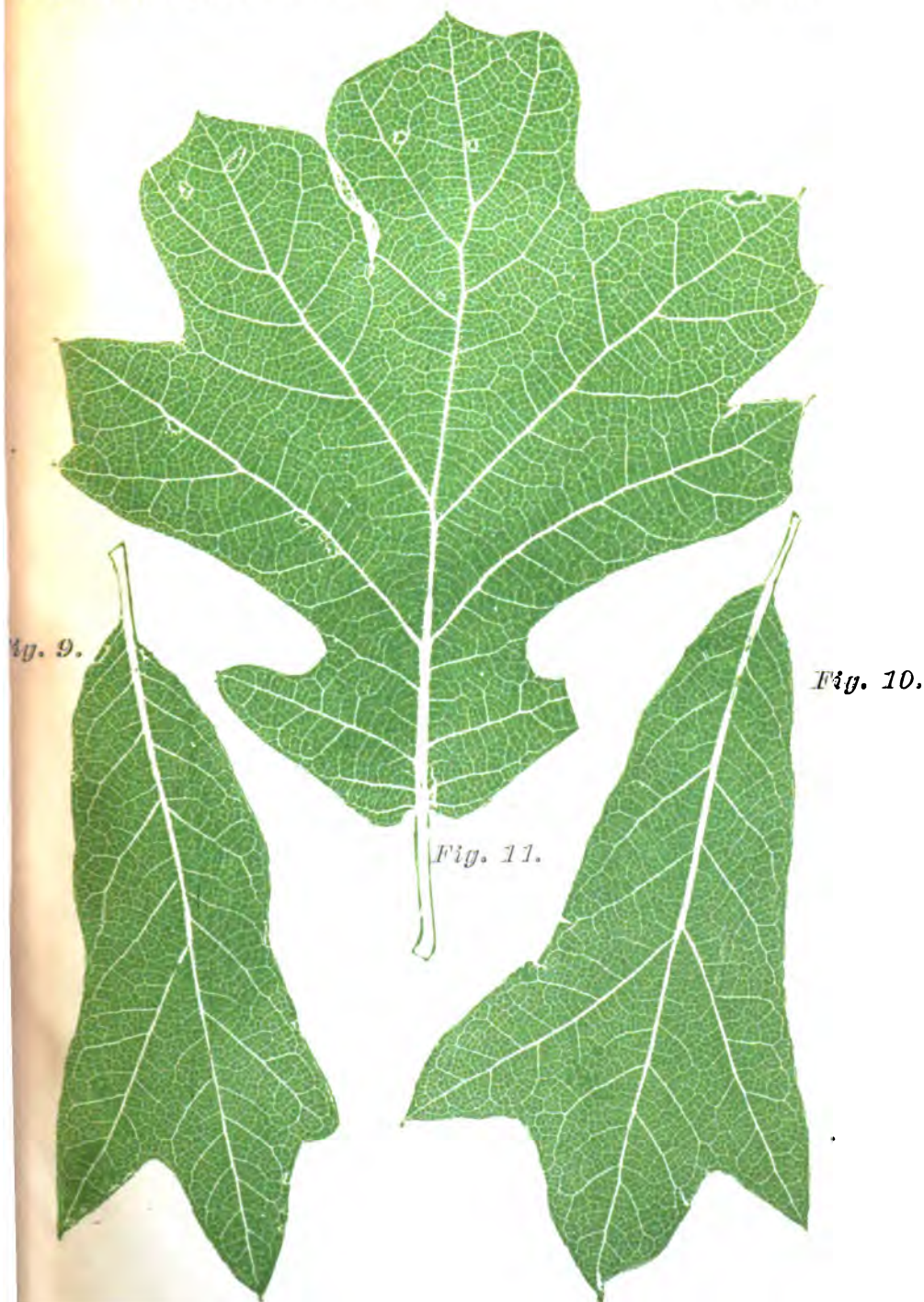
Fig. 5.

FIGURE 1.....QUERCUS PHELLOS, L.

FIGURES 2, 3, 4, 5.....Q. PHELLOS, L., X Q. NIGRA, L., = Q. RUDKINI,

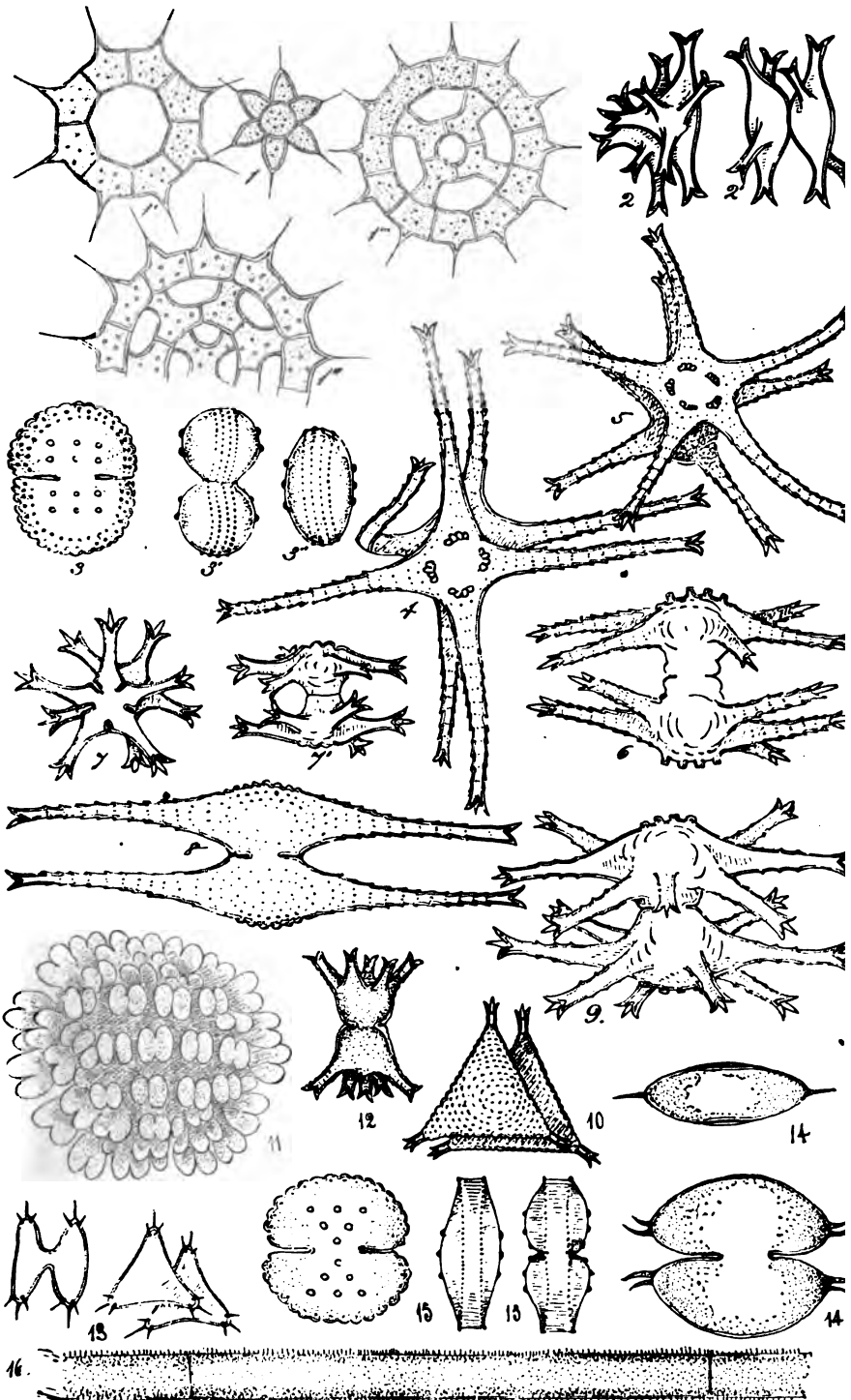


FIGURES 6, 7. Q. PHELLOS, L., X Q. NIGRA, L., = Q. RUDKINI.
FIGURE 8. UNLOBED Q. NIGRA, L. (Q. FERRUGINEA, MICHX.)



FIGURES 9, 10.....Q. PHELLOS, L., X Q. NIGRA, L. = Q. RUDKINI.

FIGURE 11.....LOBED Q. NIGRA, L.



NEW FRESH-WATER ALGAE.

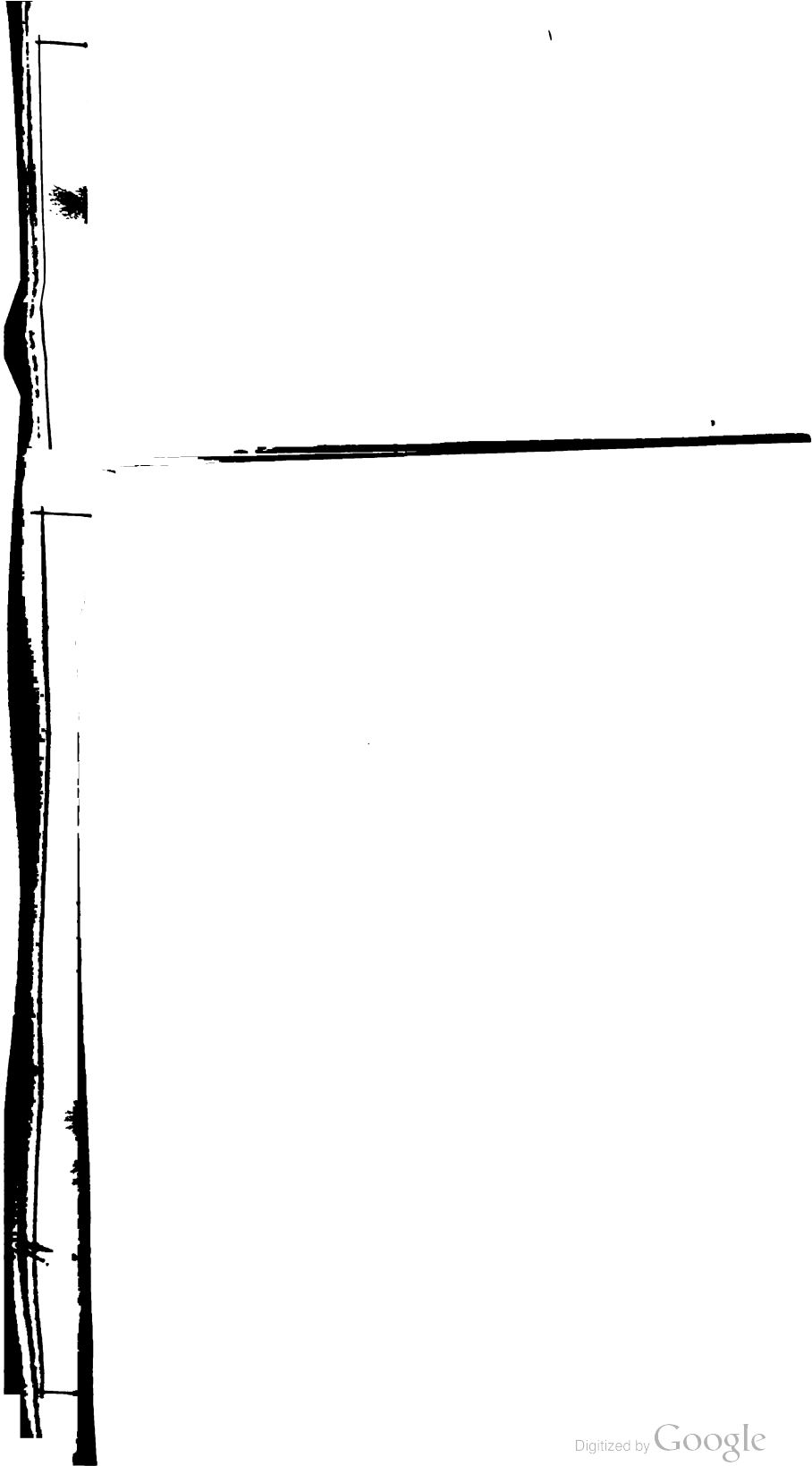






PLATE XXII. SURVEY OF THE SURFACE OF THE



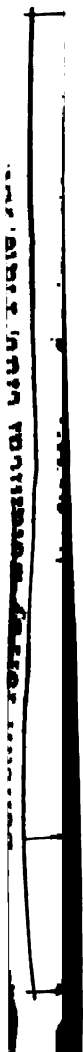


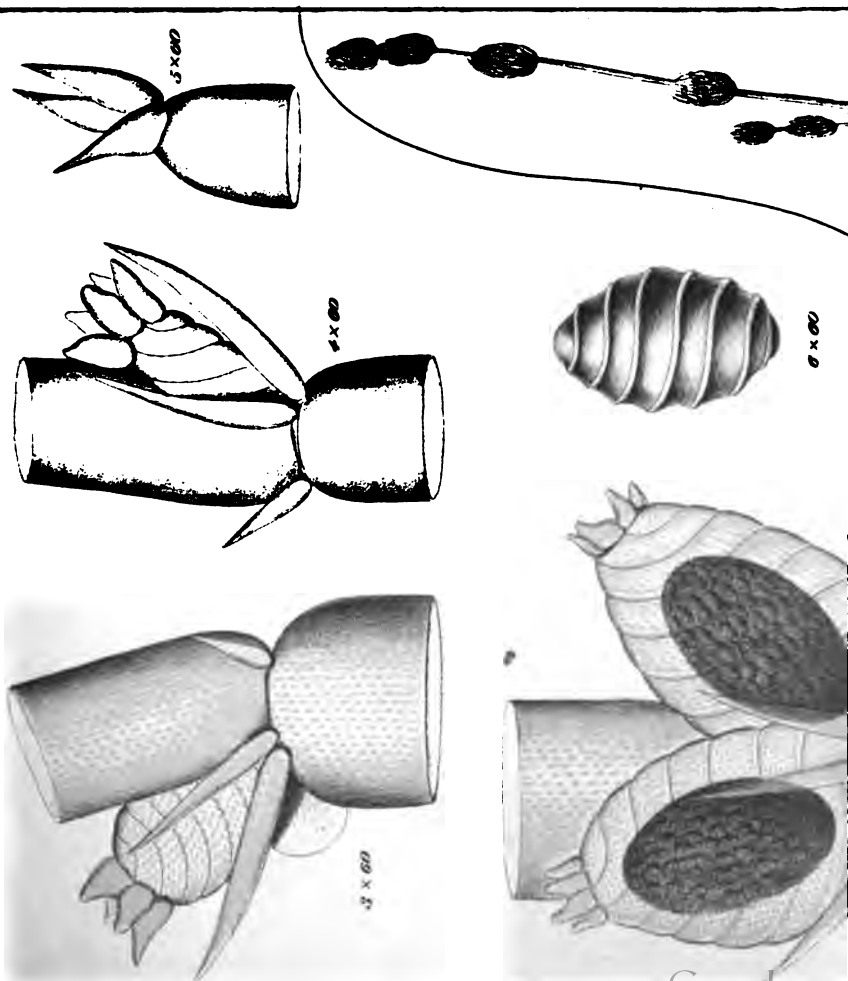
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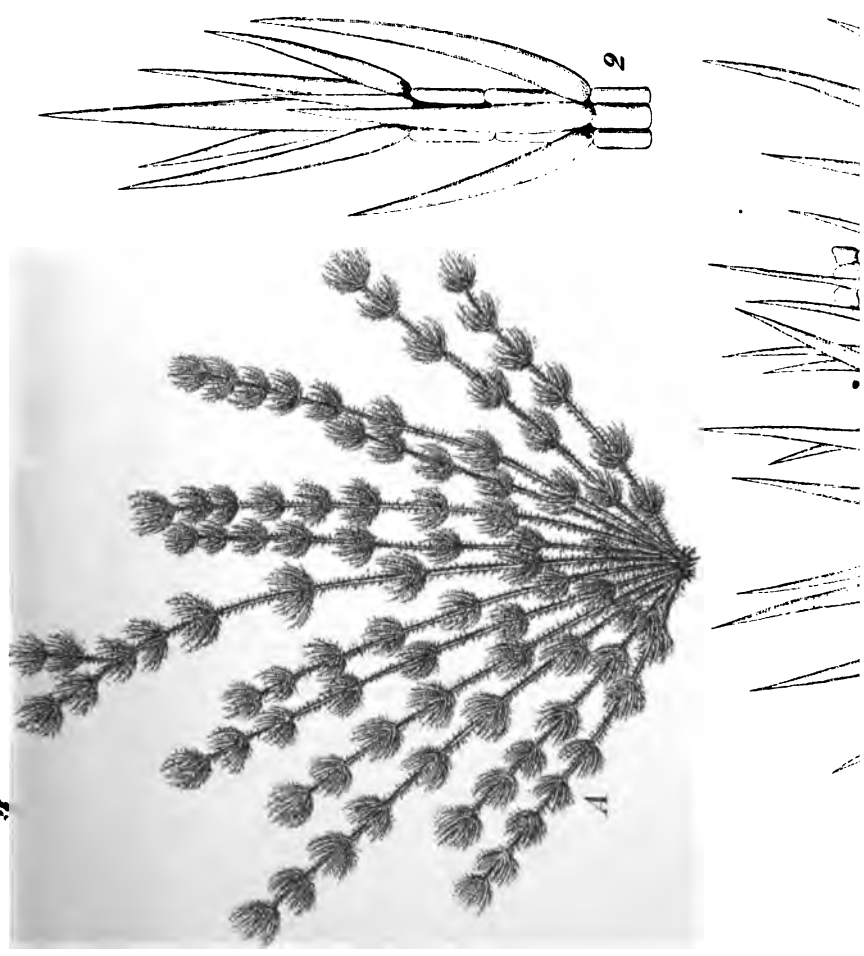
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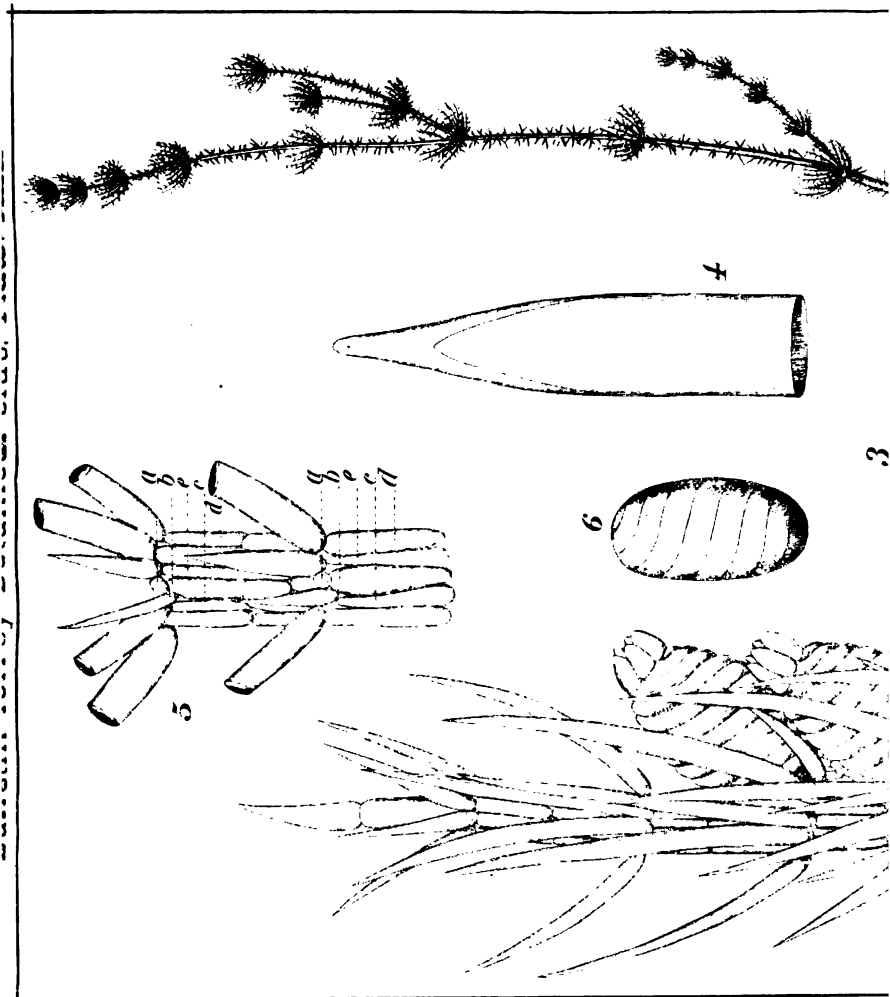
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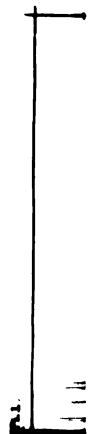












PLANT-TOFFEE DULCIFICUS, 1818, 1819

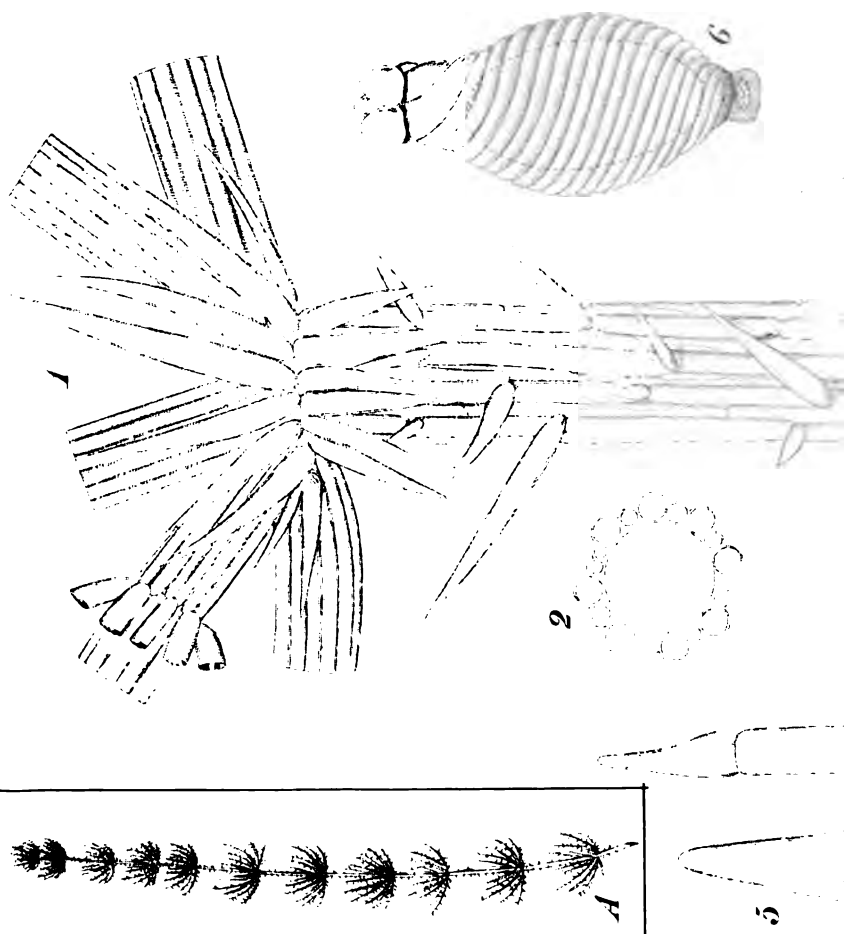






FIG. 11.



FIG. 8.



FIG. 12.

FIG. 9.

Figs. 1 to 7, *PHYSARELLA MIRABILIS*, Pk.
Figs. 8 to 12, *CALICIOPSIS PINEA*, Pk.



FIG. 1.



FIG. 2.



FIG. 3.



FIG. 7.



FIG. 6.

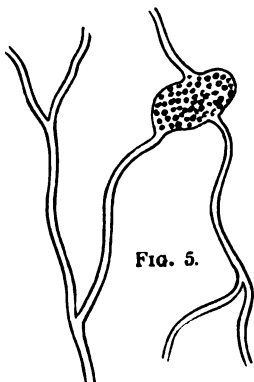


FIG. 5.



FIG. 4.

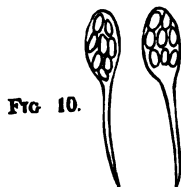


FIG. 10.

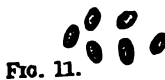


FIG. 11.



FIG. 12.



FIG. 8.

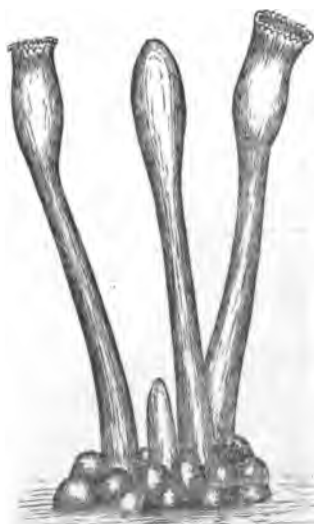
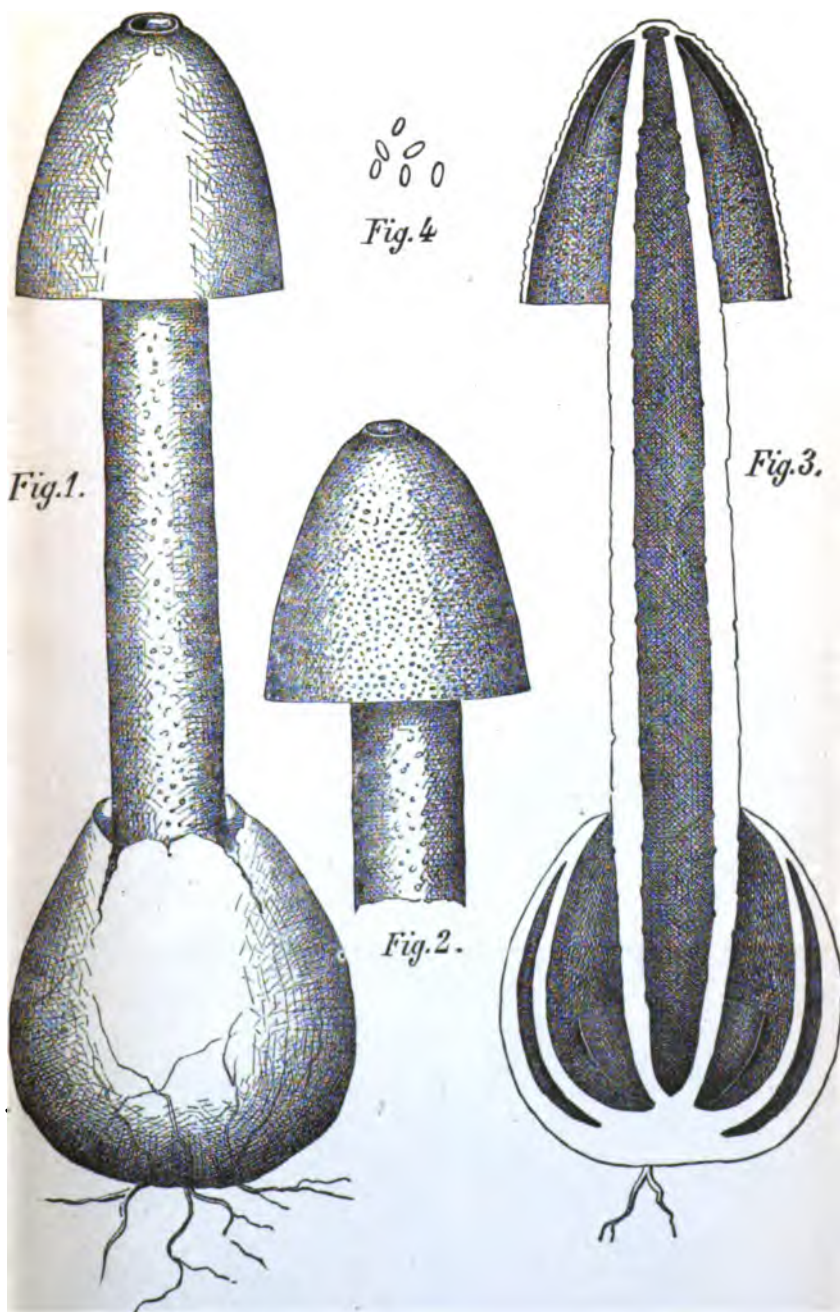


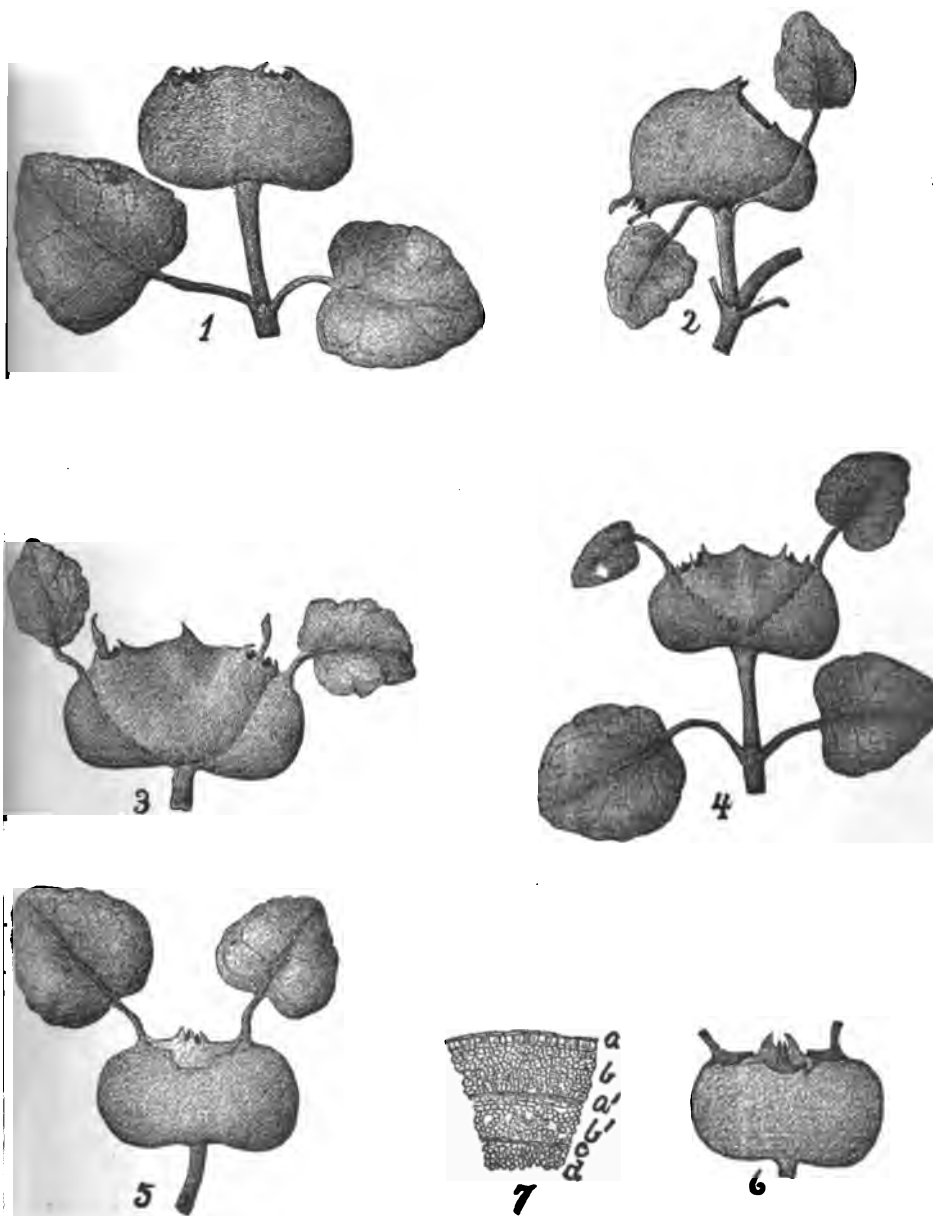
FIG. 9.

Figs. 1 to 7, *PHYSARELLA MIRABILIS*, Pk.

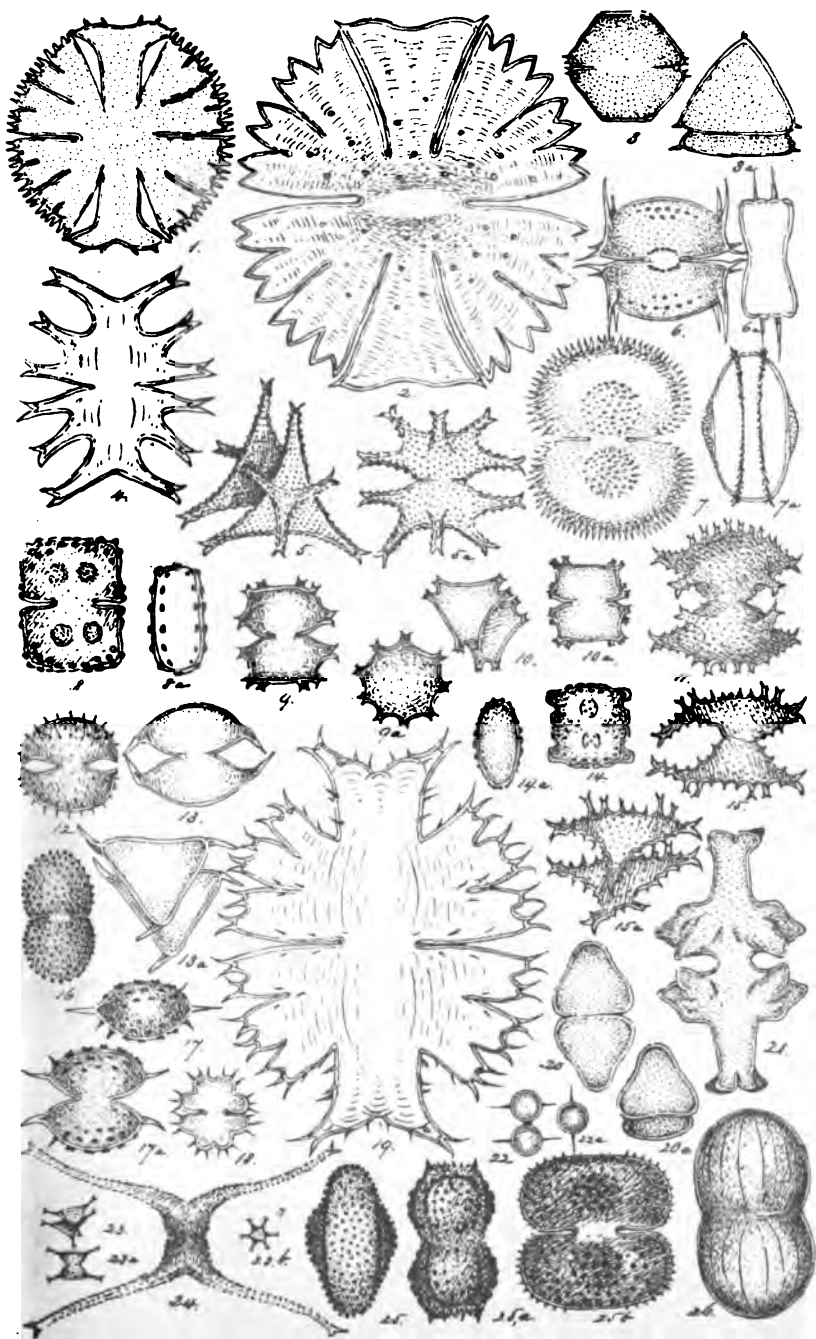
Figs. 8 to 12, *CALICIOPSIS PINEA*, Pk.



PHALLUS RAVENELII, Berk. & Curt.



W. R. Dudley, del.



NEW AMERICAN FRESH-WATER ALGÆ.



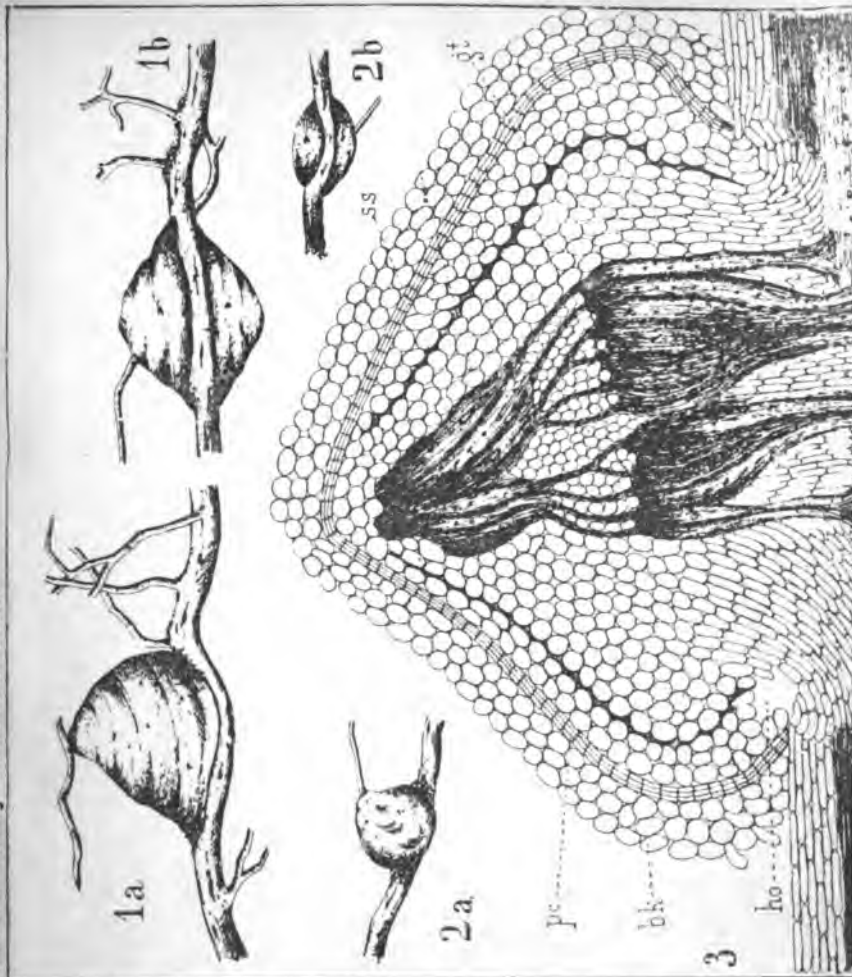




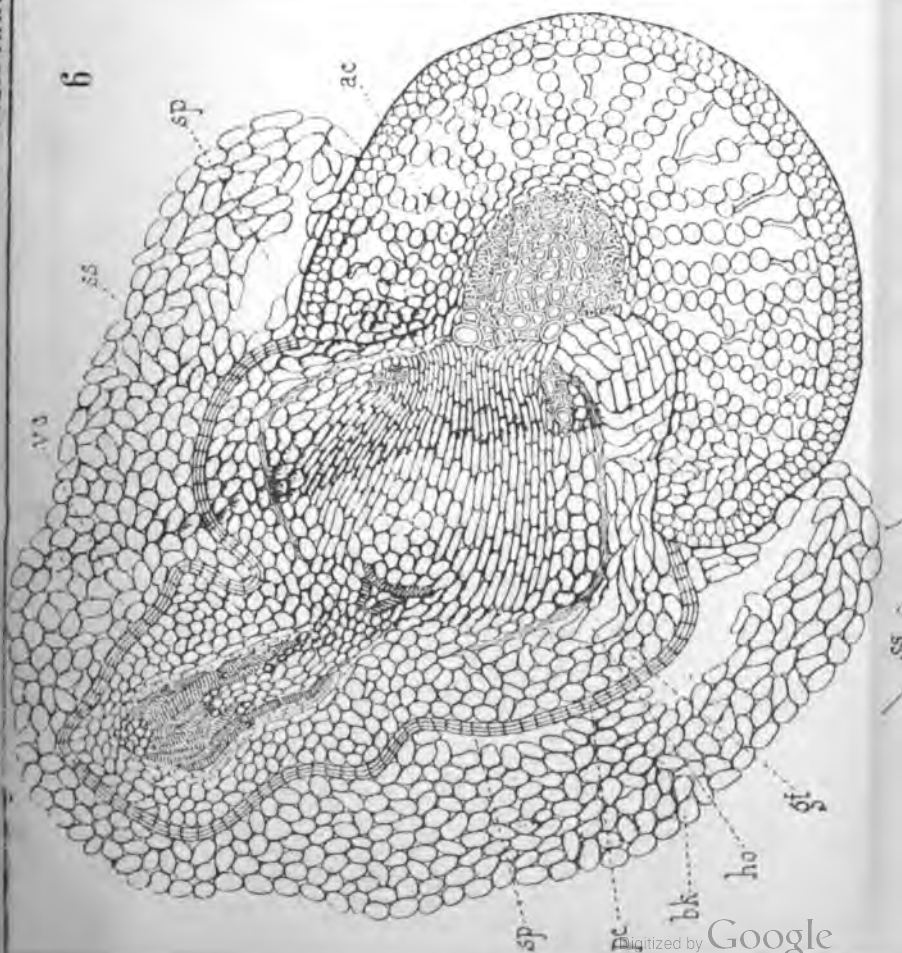








ac



2c



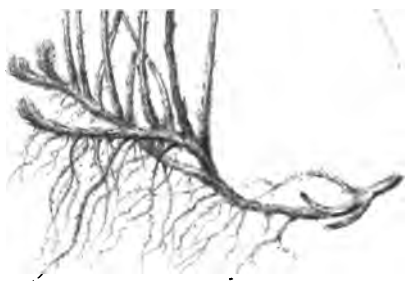
5.



6.



7.



1.



8.

C.E. Faxon del.

A. Meisel Lith.

CHEILANTHES PRINGLEI, n. sp.



C.E. Faxon del.

A. Meisner Lith.

CHEILANTHES PRINGLEI, n. sp.

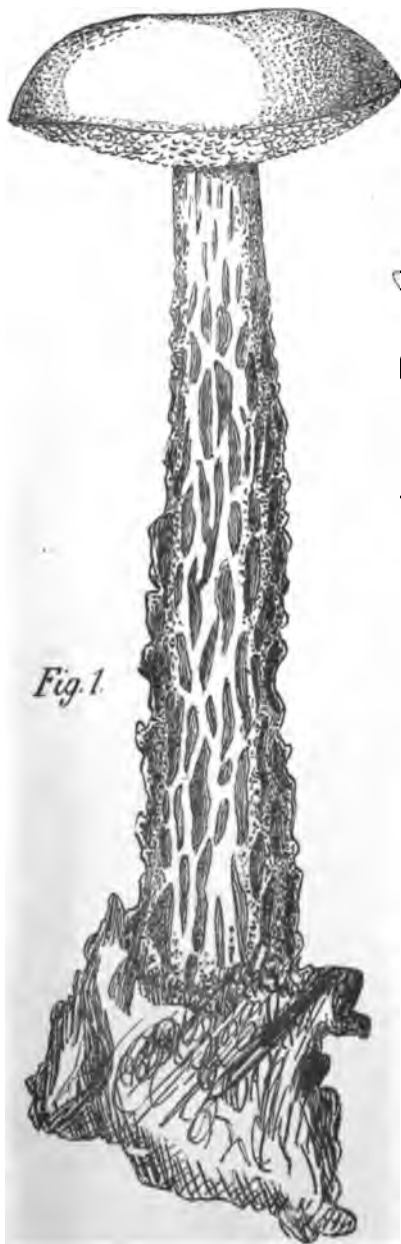


Fig. 1.

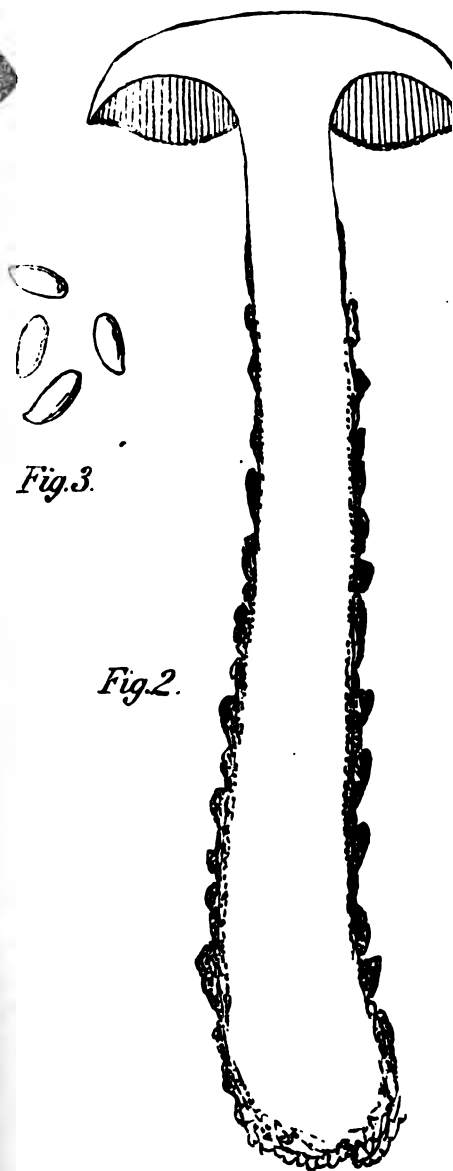


Fig. 2.



Fig. 3.

BOLETUS MORGANI, Pk.

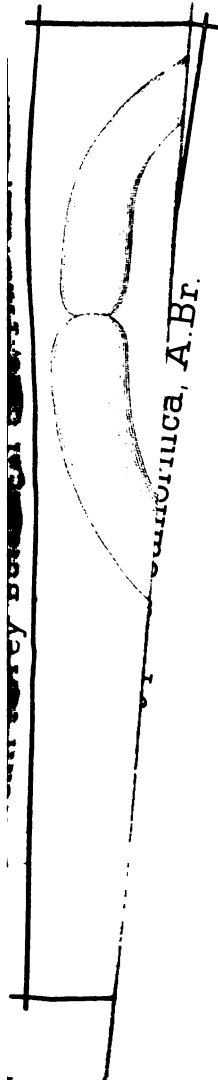
IN VAS. ADULEVIDIA. FICHT.

Polypella glomerata. Leblond var. aureoviridis. Fitch.

BUREAU TORREY BOTANICAL CLUB. PLATE XXXVIII.

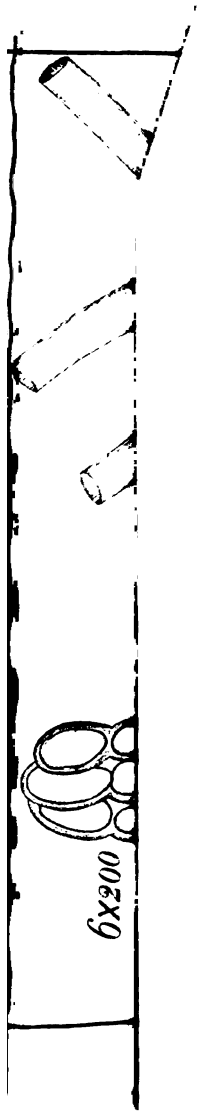
PLATE XXXIX.

Bulletin Board



C. Br.





6x200

